

MODULE SPECIFICATION FORM

Module Title:	Digital Electronics	Level:	4	Cedit Value:	10
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Module code: (if known)	ENG416	Cost Centre:	GAEE	JACS2 code:	H651
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Semester(s) in which to be offered:	1	With effect from:	September 2014
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Office use only: To be completed by AQSU:	Date approved:	
	Date revised:	
	Version No:	1

Existing/New:	Existing	Title of module being replaced (if any):	N/A
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Originating Academic area:	Engineering and Applied Physics	Module Leader:	B Birmingham
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Module duration (total hours)	100	Status:	Free-standing 10-credit component comprising digital half of ENG467 (Analogue and Digital Electronics).
Scheduled learning and teaching hours	36	core/option/elective (identify programme where appropriate):	
Independent study hours	64		
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	0%
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Programme(s) in which to be offered: Engineering European Programme (Non Award Bearing)	Pre-requisites per programme (between levels):	None
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Module Aims: To develop an understanding of basic digital logic elements and apply the knowledge in the design and evaluation of a range of combinational and sequential logic systems both practically by construction and by computer simulation.

Expected Learning Outcomes	
<u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:	
1. Analyse and compare the performance of fundamental digital components and circuits;	(KS 5)
2. Produce designs for simple combinational and sequential circuits.;	
3. Use computer modelling techniques and practical experiments to verify and assess theoretical predictions.	(KS 4)
<u>Key skills for employability</u>	
1. Written, oral and media communication skills,	7. Intercultural and sustainability skills
2. Leadership, team working and networking skills	8. Career management skills
3. Opportunity, creativity and problem solving skills	9. Learning to learn (managing personal and professional development, self management)
4. Information technology skills and digital literacy	10. Numeracy
5. Information management skills	
6. Research skills	

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. Laboratory investigations portfolio. Examples of assessment are: a 7- segment display decoder and a 4-bit counter. (This corresponds to Assessment 2 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 elements 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:

Digital representation: number systems and codes.

The transistor: as a switching element. Biasing, characteristics and properties.

Combinational logic: gates, Boolean algebra, truth tables, Karnaugh maps, minimisation, static and dynamic hazards, including propagation delay.

Sequential logic: synchronous/asynchronous, flip-flops, counters, shift registers. State diagrams and tables, timing diagrams. Monostables, multiplexers, memory elements, tri-state interfaces.

Circuit analysis and comparison of different families: TTL; CMOS; ECL, BiCmos and LVtvc. Power, speed, cost, fan-out, loading, interfacing.

BibliographyEssential Reading:

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.

Recommended Reading:

Hughes, E. et al. (2008) *Electrical and Electronic Technology*, 10th Edn., Prentice-Hall.

Tokheim, R.L. (2007) *Digital Electronics: Principles and Applications*, McGraw-Hill.