

MODULE SPECIFICATION FORM

Module Title:	Programmable Automation Controllers (PACs)	Level:	5	Credit Value:	10
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Module code: (if known)	ENG549	Cost Centre:	GAEE	JACS2 code:	H131
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Semester(s) in which to be offered:	2	With effect from:	July 2015
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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
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Originating Academic area:	Engineering and Applied Physics	Module Leader:	R Holme
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Module duration (total hours)	100	Status: core/option/elective (identify programme where appropriate):	Free-standing 10-credit component comprising second half of ENG535 (Programmable Automation Controllers - 20 cr)
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%
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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: The module aims to facilitate the understanding of the principles of PAC controlled systems and how they interface with field devices to form the control system. Along with software familiarisation, communication methods and programming techniques.

Expected Learning Outcomes
<u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:
<ol style="list-style-type: none"> 1. Extend previous knowledge of Logic programming methods and functionality into the advanced instruction set; (KS 4) 2. Evaluate devices and configurations to suit application specifications; (KS 3) 3. Integrate PLCs as part of a control system.
<u>Key skills for employability</u>
<ol style="list-style-type: none"> 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 (%).

Assessment is by means of a report covering all outcomes. Development of a more complex programme to provide a solution to a given control scenario. This should include the application of functions from the advanced instruction set, research into the characteristics of the modules used (hardware) and evaluation of the suitability of the devices, inclusive of justifications.

(This corresponds to Assessment 2 of ENG535.)

Assessment number (use as appropriate)	Learning Outcomes met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Report	100%		2000

Learning and Teaching Strategies:

Lab work – The student will have practical ‘hands on’ experience using Industrial standard PAC equipment and software. This is intended to develop, in stages, their learning and understanding. A series of lab exercise sheets will be used in order to affirm competency of specified outcomes.

Syllabus outline:

- Advanced logic programming – discrete devices, analogue devices, mathematical functions, functions used in data manipulation and control;
- Fault location and determination, removing faults, re-start of system, programming to ensure system stability;
- Programme structure – use of, and potential problems associated with, sub-routines. Allocation of file/bit addresses, in an organised manner to allow for future modification and data transfer between devices;
- Advanced functionality of PLC – indirect addressing methods, indexed addressing methods, multiplexing data inputs, etc.

Bibliography:

Essential reading:

Tubbs, S.P. (2007) *Programmable Logic Controller Tutorial, Siemens Simatic S7-200*, Siemens.
Bolton, W. (2009) *Programmable Logic Controllers*, 5th Edn., Newnes.

Recommended reading:

Petruzella, F.D. (2010) *Programmable Logic Controllers*, 4th Edn., McGraw-Hill Higher Education.