PROGRAMME SPECIFICATION

Awarding body/institution	Glyndŵr University
Teaching institution(if different from above)	
Details of accreditation by a professional, statutory or regulatory body(including link to relevant website)	IET (Institution of Engineering and Technology) http://www.theiet.org/ IMechE (Institution of Mechanical Engineers) http://www.imeche.org/Home
What type of accreditation does this programme lead to?	The course leads to IEng (Incorporated Engineer) where the IET and IMechE are the accrediting bodies
Is accreditation in some way dependent on choices made by students?	Yes The IET accredit /grant IEng status for the Automation, mechatronics and Electrical routes. The IMechE accredit /grant IEng status for the Mechanical and Maintenance routes.
Final award/s available	1) FdEng Industrial Engineering 2) Certificate of Higher Education in Industrial Engineering
Award title	FdEng Industrial Engineering
JACS 2 code	H190
UCAS code(to be completed by admissions)	
Relevant QAA subject benchmark statement/s	Foundation Degree Qualification Benchmark (May 2010) QAA Code of Practice 9: Placement and work-based learning (2007) QAA Subject benchmark statement for Engineering (2010)
Other external and internal reference points used to inform the programme outcomes	Engineering Council UK-SPEC revised 2010 (UK Standard for Professional Engineering Competence) SEMTA (Sector Skills Council for Science, Engineering and Manufacturing Technologies) ProSkills UK (Sector Skills Council for the Process and Manufacturing Sector)
Mode/s of study	Part time day release Part time block release
Language of study	English
Date at which the programme specification was written or revised	11/04/2012 Last revision 04/07/2012

Criteria for admission to the programme

Recruitment and admission procedures remain in line with the University's Regulations for Bachelor Degrees, Diplomas, Certificates, and Foundation Degrees. Applicants normally attend an interview as part of the selection process. During the interview process the admissions tutor assesses academic ability (previous qualifications) and student expectations, as well as professional experience. The interview process also allows us to ensure that all prospective students are aware of the demands of the programme.

The entry requirements for this programme are as follows:

(a) All applicants must be employed in an appropriate role/job function in industry. Advice and guidance to applicants regarding their appropriate experience and their industrial background will be offered by the admissions tutor.

AND

(b) A minimum of 120 UCAS points to include one A2 level pass or equivalent in a relevant subject. Further potential can be assessed at interview if necessary. AS awards, in appropriate subjects, can also be accepted as meeting the entry standards provided that the required UCAS points are achieved. Additionally, five GCSE passes at grades A, B or C will be expected including Mathematics, Science (Double Award), and English or Welsh.

OR

(c) A relevant BTEC National award. Particular care will be taken to ensure that Level Three of Mathematics has been achieved.

OR

(d) GNVQ at Level Three standard including Additional Mathematics and Science.

OR

(e) Equivalent qualifications of a European or overseas country referenced against NARIC.

OR

(f) Completion of an FE Access to Engineering course.

OR

(g) Suitability of qualifications and / or experience not listed above will be otherwise determined on a case by case basis at interview.

International and European applicants will be expected to have attained IELTS 5.5 or a recognised equivalent that can be certified by their last or current place of study.

Students may request exemption from modules based on previous qualifications and experiences gained. Any requests will be considered as part of the admissions process and in line with the University procedure for AP(E)L.

Aims of the programme

The programme aims to develop the intellectual and application skills of the student by means of personal management, knowledge acquisition, problem analysis, deductive skills, synthesis and evaluation of solutions, and including an awareness of social and environmental implications, in preparation for:

- A career as a professional engineer in Industry;
- A management role in industry;
- Life-long learning and an appreciation of the value of education in continuing professional development.

Thus, provides the breadth of learning, skills and attitudes for graduates to meet the future needs of a rapidly changing technology and business environment.

Distinctive features of the programme

The FdEng Industrial Engineering programme has been developed to meet the demands of industry to provide engineering qualifications that not only cover the traditional theoretical aspects associated with this vocation but also encompass new and emerging technologies that are crucial to maintaining efficiency in a competitive world market.

Engineering industries have had a huge input into the development of the programme, particularly relating to programme and module content, ensuring it is 'fit for purpose'. Also students, both past and present, have been involved with the programme development, whereby scheduling of delivery and assessment has been influenced by student feedback. As has the theory/principles, practical laboratory work and work based learning been balanced better following discussions with academics, students and industry.

The Engineering Laboratories have had nearly half a million pounds invested in equipment this year. This complements industrial equipment donations and further support in terms of funding major projects to the value of one hundred thousand pounds, in some cases .All of which enhance the student experience, as they are dealing with industrial standard equipment and facilities and not just 'educational training aids/equipment'.

Programme structures and requirements, levels, modules, credits and awards

Students will enrol on the programme on a Block Release **or** Day Release part time scheme, but cannot mix modes of delivery as teaching of the different modes will not take place concurrently. Both delivery modes would operate over two extended academic years with summer months being utilised for continuation of work-based learning. However only the block release mode will be operable for the first intake (September 2012) thereafter the delivery mode/s offered will depend upon demand from industry.

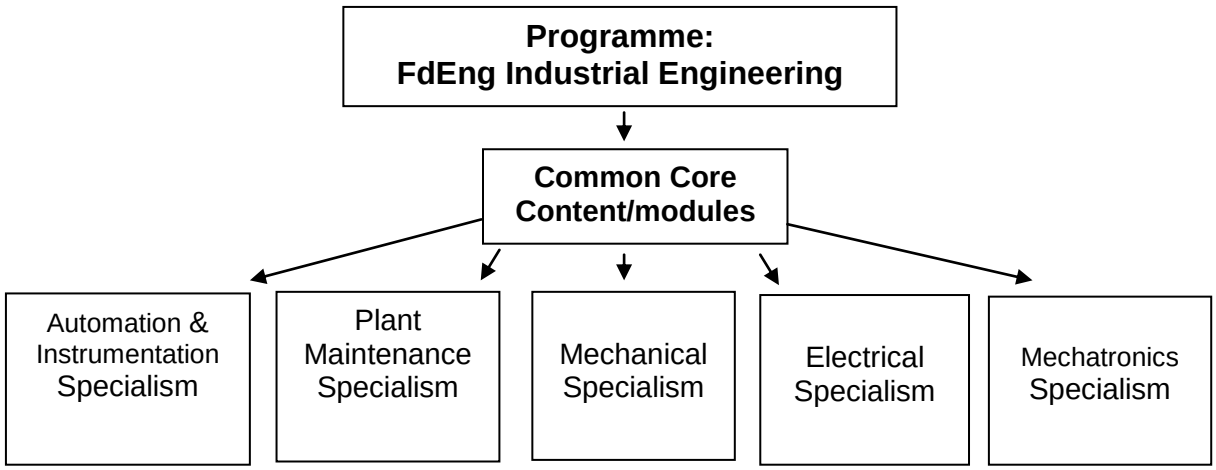
Progression from level four to five will be in accordance with current policy.

The Certificate of Higher Education in Industrial Engineering requires 120 credits to be awarded. This can be used as an exit award should circumstances dictate.

The FdEng Industrial Engineering award requires 240 credits of which 120 are from level four and 120 are from level five.

Progression onto a BEng programme (programme choice depending upon route taken) would be possible. In most cases this follows consultation and the student undertaking further studies in the form of a bridging module.

The FdEng Industrial Engineering programme has five routes, being; Electrical, Mechanical, Automation & Instrumentation, Mechatronics and Plant Maintenance. Each route consists of a number of common 20 credit modules, shared with the other routes and delivered concurrently, and a number of 20 credit 'specialism' modules. These are classified as options to the programme, but are specified for each particular route as can be seen in the table page 10.



FdEng Industrial Engineering Routes and Associated Modules

Level four modules

Automation & Instrumentation	Plant Maintenance	Mechanical	Electrical	Mechatronics
Engineering Mathematics ENG451	Engineering Mathematics ENG451	Engineering Mathematics ENG451	Engineering Mathematics ENG451	Engineering Mathematics ENG451
Engineering Science A ENG452	Engineering Science A ENG452	Engineering Science A ENG452	Engineering Science A ENG452	Engineering Science A ENG452
Work Based Investigation and Training ENG454	Work Based Investigation and Training ENG454	Work Based Investigation and Training ENG454	Work Based Investigation and Training ENG454	Work Based Investigation and Training ENG454
Operations Management ENG455	Operations Management ENG455	Operations Management ENG455	Operations Management ENG455	Operations Management ENG455
Instrumentation & Process Control ENG453	Instrumentation & Process Control ENG453	Metrology &CADCAM ENF407	Instrumentation & Process Control ENG453	Digital & Analogue Electronics ENG444
Transducers and Materials ENF408	Plant Equipment Fundamentals ENG456	Plant Equipment Fundamentals ENG456	Transducers and Materials ENF408	Transducers and Materials ENF408

Level five modules

Engineering Science B ENG540	Engineering Science B ENG540	Engineering Science B ENG540	Engineering Science B ENG540	Engineering Science B ENG540
Diagnostics, Maintenance & Functional Safety ENG541	Diagnostics, Maintenance & Functional Safety ENG541	Diagnostics, Maintenance & Functional Safety ENG541	Diagnostics, Maintenance & Functional Safety ENG541	Diagnostics, Maintenance & Functional Safety ENG541
Project Management & Presentation Techniques ENG543	Project Management & Presentation Techniques ENG543	Project Management & Presentation Techniques ENG543	Project Management & Presentation Techniques ENG543	Project Management & Presentation Techniques ENG543
Project ENG544	Project ENG544	Project ENG544	Project ENG544	Project ENG544
PACs ENG535	Applied Engineering ENG545	Applied Engineering ENG545	PACs ENG535	PACs ENG535
Industrial Data and Network Design ENG546	Power, Distribution and System Design ENG542	Manufacturing, Design & Technology ENF507	Power, Distribution and System Design ENG542	Mechatronic Systems ENF508

Module Title	Core/ Option	Level	Module Code	Credit Value	Semester of delivery	Module Leader
Engineering Mathematics	core	4	ENG451	20	1-2	B. Klaveness
Engineering Science A	core	4	ENG452	20	1-2	C. Belloc
(WBL) Work Based Investigation and Training	core	4	ENG454	20	1-3	R Holme (D.Sprake)
(WBL)Operations Management	core	4	ENG455	20	1-3	F.Welcomme
Instrumentation & Process Control	O / PM, AI&Elec	4	ENG453	20	1-3	F.Welcomme
Plant Equipment Fundamentals	O / PM& Mechanical	4	ENG456	20	1-3	S. Byrne
Transducers and Materials	O/ AI,Elec& Mechatronics	4	ENF408	20	1-3	R Holme
Metrology & CADCAM	O/Mechanical	4	ENF407	20	1-3	S. Byrne
Digital and Analogue Electronics	O/Mechatronics	4	ENG444	20	1-3	B Birmingham
Engineering Science B	core	5	ENG540	20	1-2	B Birmingham/
Diagnostics, Maintenance & Functional Safety	core	5	ENG541	20	1-2	Z Chen
Project Management & Presentation Techniques (WBL)	core	5	ENG543	20	1-3	P Storrow
(WBL) Project	core	5	ENG544	20	1-3	R Holme
Applied Engineering	O / PM& Mechanical	5	ENG545	20	1-3	S. Byrne
PACs (Programmable Automation Controllers)	O / Elec, AI& Mechatronics	5	ENG535	20	1-3	R Holme
Power, Distribution and System Design	O / Elec& PM	5	ENG542	20	1-3	Y Vagapov
Industrial Data and Network Design	O / AI	5	ENG546	20	1-3	F Welcomme
Manufacturing, Design & Technology	O / Mechanical	5	ENF507	20	1-3	S Byrne
Mechatronic Systems	O/Mechatronics	5	ENF508	20	1-3	B. Klaveness

Block Release Delivery Year One / Level Four (contact time)

Module	Semester 1		Semester 2		Semester 3
	Block 1	Block 2	Block 3	Block 4	
Engineering Mathematics	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Engineering Science A	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Work Based Investigation &Training	*6 hours*	*6 hours*	*6 hours*	*6 hours*	*6 hours*
	Work based learning				
Operations Management	*6 hours*	*6 hours*	*6 hours*	*6 hours*	*6 hours*
	Work based learning				
Option 1	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Option 2	*14 hours*	*14 hours*	*14 hours*	*14 hours*	

Block Release Delivery Year Two / Level Five (contact time)

Module	Semester 1		Semester 2		Semester 3
	Block 1	Block 2	Block 3	Block 4	
Engineering Science B	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Diagnostics, Maintenance & Functional Safety	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Project Management & Presentation Techniques	*4 hours*	*4 hours*	*4 hours*	*4 hours*	*4 hours*
	Work based learning				
Project	*4 hours*	*4 hours*	*4 hours*	*4 hours*	*4 hours*
	Work based learning				
Option 1	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Option 2	*14 hours*	*14 hours*	*14 hours*	*14 hours*	
Students wishing to progress onto a BEng programme (level six) will also follow the appropriate bridging module, delivery to be concurrent with normal block weeks, contact as shown below.					
Bridging Module	*10 hours*	*10 hours*	*10 hours*	*10 hours*	*12 hours*

Day Release Delivery Year One / Level Four (contact time)

Module	Semester 1 (14 weeks)	Semester 2 (14 weeks)	Semester 3 (14 weeks)
Engineering Mathematics	*2hrs/week*	*2hrs/week*	
Engineering Science A	*2hrs/week*	*2hrs/week*	
Work Based Investigation &Training	*1hr alternate wks*	*1hr alternate wks*	*4hrs/month over 4 months*
Operations Management	*1hr alternate wks*	*1hr alternate wks*	*4hrs/month over 4 months*
Option 1	*2hrs/week*	*2hrs/week*	
Option 2	*2hrs/week*	*2hrs/week*	

Day Release Delivery Year Two / Level Five

Module	Semester 1 (14 weeks)	Semester 2 (14 weeks)	Semester 3 (12 weeks)
Engineering Science B	*2hrs/week*	*2hrs/week*	
Diagnostics, Maintenance & Functional Safety	*2hrs/week*	*2hrs/week*	
Project Management & Presentation Techniques	*1hr alternate wks*	*1hr alternate wks*	*2hrs/month over 3 months*
Project	*1hr alternate wks*	*1hr alternate wks*	*2hrs/month over 3 months*
Option 1	*1hr/week*	*2hrs/week*	*1hr/week*
Option 2	*2hrs/week*	*1hr/week*	*1hr/week*
Students wishing to progress onto a BEng programme (level six) will also follow the appropriate bridging module, delivery to be concurrent with normal day release, contact as shown below.			
Bridging Module	*1hr/week*	*1hr/week*	*2hrs/week*

The intended learning outcomes of the programme have been grouped under the headings of:

A. Knowledge and Understanding;
B. Intellectual Skills;
C. Subject Skills;
D. Practical, Professional and Employability Skills.

For clarity, these programme learning outcomes have been differentiated by Level. Upon completion of each level, students will be able to:

Knowledge and Understanding (A)

	Level 4	Level 5
A1: Mathematical techniques, procedures and methods	A1: Develop an understanding of mathematical concepts or principles relevant to Industrial Engineering	A1: Apply mathematical concepts or principles relevant to Industrial Engineering problems.
A2: Knowledge of Scientific of Principles	A2: Identify and explain scientific principles relevant to Industrial Engineering	A2: Develop scientific principles and demonstrate an understanding of relevant applications within Industrial Engineering
A3: Technical Understanding	A3: Develop an awareness of current technologies and their uses within Industrial Engineering	A3: Critically appraise current and future technologies and develop an awareness of the sustainability implications.

Intellectual Skills (B)

	Level 4	Level 5
B1: Analysis	B1: Identify problems and potential causes and effects	B1: Identify and analyse problems and use diagnostic methods to recognise causes and achieve satisfactory solutions
B2: Organisation	B2: Identify, organise and use resources to complete tasks safely and efficiently	B2: Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety and environmental impact.
B3: Problem Solving	B3: Apply given tools/methods to a well defined problem and begin to appreciate the complexity of the issues.	B3: Recognise and define key elements of problems and choose appropriate methods for their resolution in a considered manner.
B4: Evaluation	B4: Form opinions based upon knowledge and understanding of the subject in question	B4: Present arguments to uphold decisions following an evaluation of a particular subject.

Subject Skills (C)

	Level 4	Level 5
C1:Laboratory	C1: Conduct given laboratory experiments to investigate engineering principles and properties of devices and systems	C1: Devise laboratory experiments to prove engineering principles and properties of devices and systems
C2: Design	C2: Design and construct devices and systems to meet given performance criteria	C2: Design & construct devices/systems and devise methods of testing to check for given performance criteria
C3: Continuous Improvement	C3: monitor processes or systems, and develop an awareness of possible improvements.	C3: monitor processes or systems, trend processes and make predictions, in order to bring about continuous improvement.

Professional and Employability Skills (D)

	Level 4	Level 5
D1: Research & Study Skills	D1: Identify basic information and suitable sources, carry out searches and bring information together in a way that ensures work is accurate, clear and properly saved.	D1: Plan how to obtain and use required information for the purpose of an activity and use appropriate structures and procedures to explore and develop information.
D2: Communication	D2: Use oral, written and electronic methods for the communication of technical and other information	D2: Use oral, written and electronic methods for effective communication of technical and other information
D3: Work Safety	D3: Apply safe systems of work	D3: Manage and apply safe systems of work
D4: Employability	D4: Work reliably without close supervision accepting responsibility for tasks undertaken	D4: Demonstrate the ability to work reliably and effectively without supervision accepting responsibility for tasks undertaken
D5: Information Technology	D5: Operate and communicate using IT in a format appropriate to the discipline.	D5: Operate and communicate effectively using IT in formats appropriate to the discipline.
D6: Professionalism	D6: Use CPD to maintain competence and reflective practice.	D6: Make effective use of CPD to ensure ongoing competence at the level of future intended practice.

CURRICULUM MATRIX

Demonstrating how the overall programme outcomes are achieved and where skills are developed and assessed within individual modules.

				Knowledge and understanding, intellectual skills, subject skills, and practical, professional and employability skills														
		Module Title	***Core/Opt***	***A1***	***A2***	***A3***	***B1***	***B2***	***B3***	***B4***	***C1***	***C2***	***C3***	***D1***	***D2***	***D3***	***D4***	***D5***	***D6***
FdEng (240 credits)	Level 4 *Cert HE (120 credits)*	Engineering Mathematics	core	✓	✓				✓										
		Engineering Science A	core	✓	✓		✓			✓	✓		✓	✓					
		Work Based Investigation &Training	core		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
		Operations management	core			✓		✓		✓					✓	✓	✓	✓	✓
		Instrumentation and Process Control	*Option*	✓	✓	✓			✓		✓		✓						
		Plant Equipment Fundamentals	*Option*		✓	✓	✓		✓		✓		✓						
		Transducers and Materials	*Option*		✓	✓			✓		✓	✓	✓						
		Metrology & CADCAM	*Option*		✓	✓			✓		✓	✓	✓						
		Digital & Analogue Electronics	*Option*		✓	✓			✓		✓	✓	✓						
	Level 5	Engineering Science B	core	✓	✓		✓			✓	✓		✓	✓					
		Diagnostics, Maintenance and Functional Safety	core	✓	✓		✓		✓	✓	✓		✓						
		Project Management and Presentation Techniques	core		✓					✓				✓	✓	✓	✓	✓	✓
		Project	core	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓	✓
		Applied Engineering	*Option*		✓	✓		✓		✓	✓		✓			✓	✓		
		Programmable Automation Controllers (PACs)	*Option*			✓	✓		✓	✓		✓	✓			✓		✓	
		Power, Distribution and System Design	*Option*	✓	✓	✓		✓	✓			✓	✓			✓	✓		
		Industrial Data and Network Design	*Option*			✓		✓			✓	✓		✓			✓		
		Manufacturing, Design and Technology	*Option*			✓			✓	✓	✓	✓		✓			✓		
		Mechatronic Systems	*Option*			✓		✓			✓	✓		✓			✓		

Learning and teaching strategy used to enable outcomes to be achieved and demonstrated

Overview

The learning and teaching strategy has been developed within Glyndŵr University's Teaching and Learning Framework, the QAA Subject Benchmark statement for Engineering (2010), the QAA Foundation Degree Qualification Benchmark (2006) and the QCA (Qualifications and Curriculum Authority).

The programme team has developed a strategic approach to delivering learning and teaching which meets the needs of the student group, enables skills development, allows for the practice application of knowledge and encourages students to become reflective practitioners. The balance between class contact / formal teaching and directed study is detailed within the module specifications. Students will apply their learning to the work place and will be encouraged, through classroom activities and assessments, to reflect on their own practice and organisational practice in order to improve their own performance as well as giving them the knowledge and confidence to contribute towards the development of organisational performance and improvement. They will also be expected to reflect on experiences within the workplace and use these as a basis for learning.

Learning and Teaching are activities which operate at different levels simultaneously. To the student the immediate activity relates to the explicit topics being studied. However, other skills (transferable skills) are also inherent in order for the student to both carry out the tasks and to develop. These elements are built into the modules comprising the programme as what might be called embedded issues. Other embedded issues, such as awareness of environmental impact and commercial implications are also included in modules throughout the programme.

Knowledge and Understanding

Acquisition of knowledge is by means of lectures, practical and laboratory-based exercises, investigative exercises involving searching of various sources, directed reading and further reading. Pre-written notes will have a role in supporting these activities. Understanding is developed through tutorials, discussion, evaluation exercises and individual exercise sheets.

Intellectual Skills

These skills are developed by the students undertaking individual activities, within tutorials and practical sessions, or by being required to contribute to group activities. In each case, throughout the course a range of problems are set requiring the student to carry out information searches, analysis, design formulation, synthesis, test definition, modelling - by computer, methodology or by calculation - and evaluation of an implementation. Reflective self-evaluation forms part of this. Critical evaluation is encouraged via debate and discussion in the tutorials.

Transferable/key skills

Transferable skills include: communication skills, ability to work in a group or on one's own, management of time, use of computers and other technology, the application of calculations (the discipline of regularly attending and contributing to classes exercises the transferable skills of self management and time management). Each module specification provides examples of transferable skills covered within its learning outcomes. Beyond this most modules require performance in several skill areas including self-management, communication and use of computer packages. All of these are monitored by the module tutors and feedback given.

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VLE (Virtual Learning Environment)

Extensive use is made of Glyndŵr University's VLE, Moodle, to enhance the learning experience.

Moodle is used by most staff to provide information about the courses and individual modules, and also as a repository of lecture notes and links to other sources of information.

Moodle can also be used for some types of assessment and to communicate with individual students or groups. For example we have developed several on-line quizzes, which are used for formative assessment during module delivery, as practice for formal in-course tests, and also in some cases for summative tests, replacing traditional paper based examinations. These are used where appropriate to supplement the more traditional forms of assessment.

Feedback from our current students suggests that they find Moodle very useful as a learning aid and the quizzes help maintain motivation during the course and for revision etc.

This is particularly useful with part time / block attendance students, who only have limited access to PC's and the intranet during their attendance because of the intensive nature of their contact hours. Moodle is available virtually 24/7 from any internet enabled PC, so this allows them to preview material before attending, and review lecture and supplementary notes afterwards, as well as being able to submit work and receive feedback outside of the 2 week block of attendance (or day of release).

Use of Moodle also replaces traditional paper 'hand-outs' (in a lot of cases), meaning students cannot lose them, and are able to access them on-demand from a laptop/ipad etc. This allows them to revisit course materials, follow up internal and external links, tutorial examples and revision notes etc. Several e-books are available via Moodle, and there is access to a large resource of video and other materials particularly to support Mathematics and allied subjects.

Year tutors and programme leaders also use Moodle to disseminate support materials, such as student handbooks, notices relating to the course, assignments, examination information and past papers, revision material, information relating to professional institutions, visiting lecturers, out of hours or special events, etc.

Practical Implementation

Wherever possible, practical elements of the modules are implemented to support the principles and theoretical aspects of the subject content. This may be achieved in a number of ways such as, completing tasks in the student's workplace, tutorial demonstrations, laboratory exercises and assessed practical work.

The work-based/placement learning statement

As can be seen from the delivery schedule tables, (See pages 10 & 11), each level has two twenty credit modules that are designated as work based learning.

During consideration of work based learning reference was made to the QAA Code of Practice on Placement and Work-based Learning and the QAA Foundation Degree benchmark statement. Although the delegates from industry will not be on 'placements' the same criteria stands for the work based element of this programme.

For each of the WBL modules, contact time is designated, either during block or day (release day) where the module tutor identifies the next set of learning requirements and discusses the means to achieve them. Also, the time will be used for one-to-one feedback sessions to examine each student's progress towards meeting the previous set of learning requirements.

Between the blocks (block release) or over the week (day release) students will be expected to make continual progress towards meeting the learning outcomes. To facilitate this process, the

dedicated University engineering mentor visits the students at their work place. Also, module leaders or the programme leader will sometimes accompany the mentor, as time permits, particularly if a student is not performing as expected.

It is beneficial if the student's supervisor/managers are present during the onsite visits as the opportunities for the student to meet the learning outcomes can be discussed and either suitable work or access to necessary equipment / facilities can be arranged for the student. Progress is reviewed and any difficulties discussed along with general guidance relating to the content and presentation of any work to be handed in.

A Work Based Module Learning Agreement document (See appendix 1) is used for each student in order to provide an auditable tracking method of each student's progress. The mentor primarily is responsible for the completion and update of this document. It is to be used in conjunction with the module tasks /assignments set by the module leader and identifies the necessary learning outcomes along with a record of progress. This document is updated during at least four site visits per year and will be visible, via Moodle, to staff and student. Employers may ask students to show them a copy of the Learning Agreement.

The particular learning outcomes are stated in the module specifications and the means of achieving them will be stated by the module leader in the given assignments or tasks.

It will be the responsibility of the mentor to ensure the learning agreements for each module were completed and signed. In order to do this the mentor would have to meet with the student and supervisor at their place of work, usually between the first and second blocks. The mentor would use his/her professional judgment in conjunction with the module leader, to decide if the criteria and tasks, as laid out in the learning agreement (sample in appendices), could be met. Also it is the responsibility of the mentor to ensure that all parties receive copies of the agreements.

If a student's circumstances change, such as they are no longer with the same employer, and the student does not have the opportunities to complete the work based learning elements of the programme, then a contingency has to be implemented. This entails the student completing 'simulated work experience' within Glyndŵr University's laboratories, where the necessary facilities, supervision and guidance can be provided.

Welsh Medium

Whilst students are entitled to submit assessments in Welsh, none of the programme can be delivered through the medium of Welsh.

Assessment strategy used to enable outcomes to be achieved and demonstrated

Assessment Methods:

In Course Test

In course tests are usually an 'unseen' paper sat in an invigilated environment. An exception to the unseen element is when a case study is required for reference. Indicative feedback of results will be provided to students within three weeks of the submission date. Official results will be provided in the form of a transcript after assessment boards have been convened.

Note: The in-course tests will be set in a similar style to a formal written examination, with a similar type of paper and with a similar level of academic rigour. However, it will be sat under the supervision of the programme team, rather than under the central university administration, in order

to provide flexibility in the timing of the assessment activity.

Assignment

This is a single task given to the student in the form of a 'brief' defining the assignment requirements at or near the beginning of the module. This may require the student to carry out investigations and literature searches in his/her own time and under his/her own initiative or it may require independent problem solving based on work covered in the lectures/tutorials. The work is normally required in the form of a formal report submitted by a given deadline. Sometimes a presentation – individually or as a group –forms part of the assessment.

Portfolio

This is a term referring to a collection of small, and perhaps diverse, exercises whose individual marks are brought together in a single folder to form a single in-course mark. Examples are where a series of laboratory exercises form part of the module. Feedback is given after each exercise (called formative assessment) so that a student is aware of progress made on an on-going basis.

Continuous Assessment

Some modules use continuous assessment whereby a set of progressive exercises are used to build up to the achievement of a major task. Each exercise is given a mark (called summative assessment) and feedback given, usually during class, in order to help with the next stage. The final mark is a combination of these marks. It is also the preferred method of assessment for the project, as the student project develops there are interim points for assessment which are inclusive of presentations, log books, and staged formal reports. The feedback to the student is thus also continuous and assists the students to achieve their potential.

Case Studies

For some modules, a case study might be the most appropriate form of assessment whereby the student would investigate a particular scenario, software programme or an instrumentation system. They would analyse the 'subject' and convey their critical opinions – this could be verbally (oral presentation) or a short report. Very often the student is given three or four scenarios to consider simultaneously, thereby enabling comparison of advantages and disadvantages.

Assessment regulations that apply to the programme

The University's regulations for Bachelor Degrees, Diplomas and Certificates and Foundation Degrees will apply to the programme**.**

Indicative Assessment Schedule Table

Level /year	Module Title	Assessment 1	Assessment 2	Week Nos.
Yr 1 **Level 4**	Engineering Maths	In course test	In-course test	25 & 42
	Engineering Science A	Lab Report	In-course test	24&43
	Work Based Investigation & Training	Portfolio	Presentation	52

	Operations Management	Presentation	Portfolio	52
	Instrumentation and Process Control	Computer Simulations	Case Study	42&48
	Plant Equipment Fundamentals	Assignment	Case Study	43&46
	Transducers and Materials	Practical	Practical	42&47
	Metrology &CADCAM	Practical	Coursework	43&48
	Digital and Analogue Electronics	Portfolio	Portfolio	43&48
Yr 2 **Level 5**	Engineering Science B	Assignment	Assignment	25 & 42
	Diagnostics, Maintenance and Functional Safety	Case Study	Report	24&43
	Project Management & Presentation Techniques	Presentation and Reflective Journal	Portfolio	52
	Project	Report		52
	Applied Engineering	Portfolio		43&48
	PACs (Programmable Automation Controllers)	Coursework	Report	43&48
	Power, Distribution and System Design	Case Study	In-course test	43&48
	Industrial Data and Network Design	Lab Report	Assignment	43&48
	Manufacturing, Design & Technology	Portfolio		43&48
	Mechatronic Systems	Assignment	Assignment	43&48

Programme Management

Programme Team

Reg HOLME Programme Leader
Cedric BELLOC
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Dr Richard GRANT
Brian KLAVENESS
David SPRAKE
Phil STORROW
Dr Yuriy VAGAPOV

Frank WELCOMME
Dr Zheng CHEN

Quality Procedures & Management

The programme team will meet at monthly intervals to discuss items relating to the provision of the programme. Typically, items for discussion would be similar to other Engineering programmes, such as: assessment plans/schedules, student achievement, retention, future recruitment, synchronising timing of delivery, Lab facilities/improvements/requirements, other resources, problems, special circumstances and disability issues, administration etc.

Each module within the programme will have a centrally located file, within which will be all documentation relating to that module. Typically this will include; module specification, scheme of work, assessment plan, assessments, internal verification for assessments, internal moderation/second marking for assessments (when completed) and archived annual monitoring reports (AMR).

The external examiner's feedback and comments are discussed by the team and the response is included in the AMR which is produced by the programme leader. This is formally presented to and discussed at discussed at Academic Subject Boards and then submitted to Academic Programmes Sub-committee.

Existing arrangements for quality assurance will apply to the programme. The following annual quality assurance mechanism will operate for the programme:

- Annual Monitoring Report (AMR)
- Issues raised in external examiner reports are referred to Academic Subject Boards for further action, particularly when quality or resource issues are a concern;
- The capture and use of formal and informal student feedback and its interpretation is embedded in the AMRs and discussed;
- External examiners comments are responded to and this response is included in the AMRs for each programme;
- A Plenary session is held for the Institute to feedback on the overall quality of the AMR's.

Feedback to students

Feedback – both formal and informal – is given to students throughout the programme. Feedback may be verbal, given during tutorials or lab exercises, where both student and lecturer can identify problems and steps can be taken to improve future work. Feedback is presented as part of a continuous assessment plan, such as the development of a portfolio; this may be verbal or written feedback, or it may be formal written feedback, as in the case of assignment marking with comments.

It should be noted that much of the feedback, not only identifies problems along with suitable guidance, but also highlights the student's achievements. This approach usually works better than simply "must try harder".

In some cases 'progressive feedback' is the most suitable approach, particularly when there are many problems with an individual student's work. i.e. do not try to mend everything all at once, as this can lead to the student becoming demoralised, but rather work on the most important aspects

first, whilst introducing other improvements later.

Feedback From students

Student Representatives Will be elected from the student group, and will attend the Programme Team meetings to provide a student input. Copies of the minutes are given to the class representative to disseminate the information back to the group, and through the minutes, students will also be notified of any actions taken. Where complaints need to be aired, the student representative can act as a communication channel and thus avoid personalising any difficulty. He / she will also be able to bring urgent matters to the Programme Leader's attention by a direct approach.

Personal Tutor Each student has a member of staff allocated as their personal tutor. The student may meet their tutor at a mutually convenient time, to ask for advice, give the staff feedback or obtain any other general help they might require.

Student Perception of Course and Modules forms – SPOC and SPOM are a formal method of obtaining the student views. These forms are completed anonymously and help the staff identify the good aspects (from the students' point of view) of the programme/modules and the areas that they think need improvement. The staff analyse the results and summarise the consensus.

Staff Student Consultative Committee
Student views are gained anonymously by a senior person from another department who chairs an open meeting of a section of the student body within Engineering (similarly for other departments). The feedback obtained is formally recorded. Copies of the minutes are given to the class representative to disseminate the information back to the group. The points arising are then discussed at School Board and information is fed back to Programme Team meetings and issues minuted. If the matter cannot be resolved at this level, issues are referred to other meetings such as Subject Team meetings or back to the School Board and on to Senate or its sub-committees if necessary.

Industrial Meetings. Regular meetings take place with industries training managers, chief engineers, factory/site managers and regional managers. This gives them the opportunity to voice their views relating to their employees/students progress, along with any problems or issues. Also, the company's current and future training needs can be discussed and developed. Regular site visits are undertaken by the work based learning mentor (and sometimes programme leader)

Open Door Policy Staff operate an open door policy, whereby students may 'pop in' to have a chat about anything they may be concerned about, or need some help with. The feedback from the students, indicate that this is the most useful method of communicating and usually resolves any issues immediately.

Research and Scholarly activity underpinning the curriculum

Academic Research

The Subject of Engineering has set up the Engineering Research Centre under the direction of Dr Zoubir Zouaoui. This is based on a long-established 'research group' structure, with Research Centre membership comprising ten lecturers drawn from all disciplines in the Engineering subject area together with researchers and visiting professors from other universities. Research Centre members are all qualified in and have previous experience of academic research.

Examples of relevant research papers that have informed module content:
Building Fuzzy Model for Machining Process via Genetic Algorithm, submitted to IET Control

Engineering Practice, contributes to the AI module (Automation and Instrumentation)Both fail-silent behaviour of permanent magnet synchronous drives with field oriented control. *World Journal of Engineering* and Off-line estimation of squirrel cage induction motor parameters using a step voltage response*. World Journal of Engineering* have contributed toward the development of the Power, Distribution and system design

Industrial Consultancy and KTPs (Knowledge Transfer Partnerships)

Several members of staff have direct links with individual industries. Many of these have been a consequence of past students obtaining positions of influence. These have resulted in a range of involvements including (i) individual consultancy to solve specific problems, (ii) the use of government-funded KTPs to develop longer-term projects and (iii) the generation of undergraduate and post graduate student projects.

Examples of these activities are:

Use of the Materials Laboratory to investigate failure of components due to corrosion; which although was completed previously, still has relevant information/knowledge that has been used to inform the Plant Equipment Fundamentals module.

A KTP project aimed at optimising control systems used in water treatment processes for a major utilities supplier has provided real data and insight into real control problems. This has contributed toward the development of the Diagnostics, Maintenance and Functional Safety module.

Attendance at seminars and professional training courses

All lecturers are expected to undertake 'scholarly activities' as part of their professional role and this may include research or other activities such as CPD (continuing professional development). Within this each staff member is expected to maintain the currency of knowledge and developments within his/her subject area. To do this staff are encouraged to attend seminars or to attend training courses. The form of these varies from one-day manufacturers' courses, through short courses to full academic courses – even study for further degrees.

The annual, two-day IET Water Event has been attended by team members. This has given an insight into the challenges faced by all of the national utilities companies and the upcoming technologies and methodologies. Information from this seminar has contributed to several modules and is relevant to other industries, several of which have processes that

Information from the IET Power Electronics, Machines and *Drives* conference has helped inform the content of the Electrical Power Systems and Drives module.

Besides the more measurable forms of scholarly activity, most of the team are involved in day to day activities all of which contribute towards the currency of the curriculum development. This might include reading monthly journals, IET magazines, interesting internet articles, manufacturers' information and most importantly relevant information from our industrial contacts.

Particular support for learning

Student Support

General Support. Students undergo an induction, which familiarises them with locations and facilities – inclusive of library, student services, sports hall, etc. The University rules and regulations are explained along with procedures, such as sickness, extenuating circumstances etc. Also,

students are advised of the ‘open door policy’.

Personal Tutor. Shortly after enrolment, a personal tutor will be allocated to the student. This will be a member of staff with whom the student feels comfortable and who will act as the first point for assistance when the student is unhappy or in difficulty. This will cover more general problems rather than module subject matter. This role is a key element in the implementation of a student’s PDP (Personal Development Plan).

Module Tutors. If difficulty is experienced relating to the academic content of a module then staff are willing to provide advice, or even individual tutorials, to assist.

Student Counsellor. When students experience difficulty beyond the scope of the programme staff to deal with, such as financial or domestic difficulties, there are trained counsellors within the University who can provide support. The counsellor can also act as an independent point of contact if the student is uncomfortable with approaching programme staff.

Information and Student Services (ISS) The ISS is a 'one-stop' provision incorporating the library, IT facilities, careers advice, student loans and student counsellors. By calling at the Help Desk the student will be directed towards the most suitable source of advice.

Learning Resources

The available learning resources include the following:

- Several lecture theatres (ranging from 50 to 200 seats) are available around the campus – all being equipped with video, computer and projection facilities;
- IT facilities, inclusive of a number of computer Labs with dedicated engineering software available;
- Library facilities which include numerous new books which have been purchased over recent years to ensure current developments are incorporated into the programmes. There is a large collection of video and DVD material available, for both use within lectures and for students to loan. In addition, there are several relevant journals and periodicals which are maintained by the library;
- A number of general purpose laboratories exist and are equipped for multifunctional purposes;
- A number of specialist laboratories exist such as:
  - Automated Testing Facility
  - Process Control Rig inclusive of VSDs (drives)
  - PCB manufacturing
  - Electrical power, machines and distribution
  - Materials Testing
  - Thermo Fluids
  - Automation, inc. PLCs and SCADA

The above are particularly relevant to this programme and have recently undergone substantial investment.

£100,000 has been invested by United Utilities on equipment to build our process control rig. Also, Siemens UK supplied us with £60,000 of equipment and software for £6,000. ABB have supplied two flow meters free of charge (worth about £2,000).

Local industries are providing a range of sensors valves etc, in small quantities but are accumulating over time.

Equality and Diversity

The admissions process adheres to Glyndŵr University's published policies on Equal Opportunities and Student Disabilities.

Ensuring all areas of the programme (including assessments) are accessible to students on the programme supports equality and inclusion. Recognising the requirements of current regulations and legislation in relation to the Equality Act 2010 all information that is produced for students will use plain language that is free from bias.

Where deemed appropriate by the Programme Leader and individual's consent, staff are alerted to student disabilities and given advice/direction on adaptations that maybe required in relation to teaching, learning, and assessment methods.

Students who present with a specific learning requirement are referred to Student Services where they can be formally assessed and the appropriate support can be implemented. The range of support that is available to individuals ranges from one-to-one tutor support to specialist equipment and software.