PROGRAMME SPECIFICATION

Awarding body/institution	Glyndŵr University
Teaching institution (if different from above)	Deeside College – Year 1 Glyndŵr University – Year 2
Details of accreditation by a professional, statutory or regulatory body (including link to relevant website)	Accreditation by IMechE was valid up to September 2011 intake. We are currently in the process of reaccreditation.
What type of accreditation does this programme lead to?	IEng status will be applied for
Is accreditation in some way dependent on choices made by students?	N
Final award/s available eg BSc/DipHe/CertHE	FdEng/ CertHE
Award title	Aeronautical Engineering (Manufacture)
JACS 2 code	H410
UCAS code (to be completed by admissions)	
Relevant QAA subject benchmark statement/s	Engineering
Other external and internal reference points used to inform the programme outcomes	UK-Spec
Mode/s of study *(p/t, f/t, distance learning)*	Part Time
Language of study	English
Date at which the programme specification was written or revised	July 2010 Updated August 2012

Criteria for admission to the programme

Students on this programme will normally have been recruited from those already employed within an aircraft manufacturing facility. Ideally students would have some evidence of Mathematics/ Physics, but the philosophy of the programme is to appeal to as wide a range of subject backgrounds as possible - potential to be assessed at interview. Mathematics and other relevant skills are provided as necessary through additional study skills modules.

Applicants who have completed the first year of the apprenticeship or are in possession of appropriate level 3 qualifications such as National Certificate / Diploma or appropriate A levels which equate to a minimum of 120 UCAS points will be allowed to join the foundation degree.

Applicants with appropriate industrial experience will also be considered, such as those with an EASA Part 66 A licence gained through a part 147 approved training organisation.

Glyndŵr University's policies on Equal opportunities and Student Disabilities will be respected.

Accredited Prior Learning and Accredited Prior Experiential learning will also be considered in accordance with Glyndŵr University regulations.

Aims of the programme

The programme aims to:-

(i) Enable the student to have acquired a sound level of knowledge of aircraft manufacturing principles suitable for engineering applied to the aeronautical industry.

(ii) Prepare the student to demonstrate skills, knowledge and competence in aircraft field.

(iii) Develop the students' skill in the use of appropriate computer tools as aids to problem solving.

(iv) Develop the students' awareness of the importance of business and commercial aspects of work, as well as the technical aspects, within the airline industry.

(v) Enable the student to communicate effectively, in written and spoken English, particularly in relation to technical matters and present the information in a variety of formats.

(vi) Encourage the student to work both independently and as a member of a team.

(vii) Ensure that students are aware that Continued Professional Development is a lifelong process that is started with the completion of the foundation degree.

The course objectives will be met largely by means of the outcomes of individual programme modules including a scheme of industrially-based experience and development.

Distinctive features of the programme

In formulating this proposal, consideration has been given to recruitment and employment prospects for foundation degree graduates. Nationally there is a demand for aircraft engineers at professional engineer status as well as for technician/practical engineers.

Graduates of either of the proposed foundation degrees would be eligible to apply to become a registered Engineering Technician (EngTech) with the relevant professional body. This is in line with UKSpec.

For a student to achieve Incorporated Engineer status, this would involve successful completion of either of the proposed foundation degrees, and completion of further study, normally undertaken via progression to BEng (Hons) or BSc (Hons).

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

Details of duration: 2 years
Modes of study: Part-time

YEAR 1	Analytical studies 1 *(40 Credits*) Kokou Dadzie	Introduction to manufacturing processes and techniques *(20 Credits*) Bob Parry	Composites and Aero materials *(20 Credits*) Fawad Inam	Business and Quality management *(20 Credits*) Steve Byrne	Worked based learning *(20 Credits*) Steve Higham

YEAR 2	Analytical Studies 2 *(20 Credits*) Kokou Dadzie	Advanced Manufacture and CAM *(20 Credits*) Natalija Vidmer	Design and CAD *(20 Credits*) Steve Byrne	Aircraft Structural Technology *(20 Credits*) Olivier Durieux	Project *(40 Credits*) Steve Higham

Progression programme
Students successfully completing the foundation degree programmes and wishing to progress onto honours degree level will be given the option to attend a series of bridging modules appropriate to their area of speciality equivalent to further credits dependent on which honours degree is chosen. The bridging modules consist of existing ten credits Level Five BEng modules, the contents of which are very analytical and consist of mathematical principles used in traditional theory. Both the foundation degrees consist of content that is more applied and practical, with an emphasis on work based learning and development (as intended). Thus, there is a gap in the theoretical knowledge attained by the FdEng students. The bridging modules have therefore been incorporated into the scheme in order to ensure that students are fully prepared for year three (level six) content.

Graduates of the FdEng Aeronautical Engineering (Manufacture) may progress onto one of the following existing BEng (Hons) programmes:

- Aeronautical/Mechanical Engineering
- Aeronautical/Mechanical Manufacturing

Students wishing to enter these programmes will be interviewed by the admissions tutor, where they will be advised there are two possibilities; direct entry onto level five of the BEng (Hons) or entry onto level six having studied appropriate bridging modules. The students will be counselled according to their capabilities and performance on the FdEng.

The Bridging module for students progressing to **BEng (Hons) Aeronautical/Mechanical Engineering** is:

ENG576 Thermofluid Mechanics A - The BEng module introduces the students to fluid mechanics. Completion of this module would better prepare the student for the more advanced level six modules of Thermofluid Mechanics and Propulsion.

The Bridging module for students progressing to **BEng (Hons) Aeronautical/Mechanical Manufacturing** is:

ENG502 Structures - The BEng module has greater depth into certain areas of mathematics and structures. Completion of this module would better prepare the student for the more advanced level six modules of Structures, Failure of Components and Computational work to be undertaken.

The above modules are all BEng level five (year two) ten credit modules, which have been validated under the appropriate BEng (Hons) programme. As such, their suitability, content and learning outcomes have been scrutinised for progression onto level six of the relevant BEng (Hons) programme during the validation event for said programmes. Students opting for progression onto level six would normally undertake the bridging module(s), over the summer period prior to joining the BEng (Hons) programme.

Intended learning outcomes of the programme

The programme provides opportunities for learners to achieve the following outcomes on completion of level 4 of the FdEng Aeronautical Engineering (Manufacture):-

Knowledge and understanding of:-

A1. mathematical principles relevant to aeronautical engineering
A2. engineering, science and aeronautical principles
A3. design methodology and aircraft construction
A4. the understanding of aeronautical theory to devices, systems and processes
A5. the role of the engineer as a manager of himself/herself and of others
A6. current developments in the fields of aeronautical engineering

Intellectual Skills - able to:-

B1. understand manufacturing principles in the context of solving engineering and operational problems
B2. plan, conduct and report on a programme of work
B3. understand and interpret engineering data in accordance with the manufacturing procedures manual
B4. synthesise information/data from a variety of sources

B5. assess, interpret and implement decisions with an awareness of technical, economic, social, legislative, environmental and sustainability implications

Practical Skills - able to:

C1. conduct laboratory experiments to investigate aeronautical engineering principles and properties of devices and systems
C2. design, construct, test and evaluate devices and systems to meet given performance criteria, including the use of computer-based tools where appropriate
C3. prepare descriptive, interpretive and evaluative technical reports;
C4. use laboratory and workshop equipment competently and safely;

Transferable/key skills - able to:

D1. learn in familiar and unfamiliar situations
D2. communicate effectively in writing, verbally and through graphical representations;
D3. apply mathematical/numerical skills to the interpretation and solution of problems;
D4. use information technology competently - to source information, to prepare reports, to model performance using specialised software packages;
D5. work as part of a team;
D6. evaluate and reflect on own performance and self-management.

The programme provides opportunities for learners to achieve the following outcomes in completion of the FdEng Aeronautical Engineering (Manufacture):-

Application and understanding of:-

A1. mathematics to the solution of practical aeronautical engineering problems
A2. engineering and science principles in aeronautical situations
A3. using design and aircraft construction methodology in specific applications
A4. aeronautical theory to devices, systems and processes used in aviation
A5. the role of the engineer as a manager of himself/herself and of others
A6. developing technologies in the fields of aeronautical engineering

Intellectual Skills - able to:-

B1. apply manufacturing principles to the solution of engineering and operational problems
B2. plan, conduct and report on a programme (project) of original work
B3. analyse and evaluate engineering data in accordance with the manufacturing procedures manual
B4. synthesise information/data from a variety of sources
B5. Assess, interpret and implement decisions with an awareness of technical, economic, social, legislative, environmental and sustainability implications

Practical Skills - able to:

C1. conduct laboratory experiments by applying aeronautical engineering principles and properties of devices and systems with minimum supervision
C2. design, construct, test and evaluate devices and systems using current and new technologies
C3. prepare and evaluate technical reports
C4. manage and use laboratory and workshop equipment competently and safely with minimum supervision

Transferable/key skills - able to:

D1. learn in variety of situations
D2. apply appropriate communication media in problem solving
D3. apply various skills to the interpretation and solution of problems;

D4.	select and use appropriate information technology competently to solve engineering problems
D5.	work and lead as part of a team;
D6.	carry out self evaluation

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

Module Code	Module Title	Level	Core Option	Credit	Learning Outcomes																			
					A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6
ENGF403	Analytical studies 1	4	Core	40	√	√										√	√	√	√			√	√		
ENGF405	Composites and Aero materials	4	Core	20			√			√					√			√	√						
ENGF404	Intro to manufacturing processes and techniques	4	Core	20						√	√		√					√	√				√		
ENGF402	Business and quality management	4	Core	20				√			√			√	√								√	√	√
ENGF407	Work based learning*	4	Core	20					√	√		√		√	√			√		√	√		√		√
ENGF511	Design and CAD	5	Core	20			√	√						√	√		√						√		

ENGF514	Aircraft Structural Technology	5	Core	20	√	√	√			√	√		√	√		√		√				√	√		
ENGF512	Analytical studies 2	5	Core	20	√	√										√		√	√				√		
ENGF515	Advanced Manufacture and CAM	5	Core	20	√	√	√				√				√		√	√	√		√		√		
ENGF513	Project*	5	Core	40			√		√			√	√		√					√	√	√		√	√

***Shaded areas denote industrial experience modules**

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

A variety of teaching and assessment methodologies are used by the team to deliver the programmes such as: Lectures; Practical work**;** Laboratory (or workshop) exercises involving hands-on experience of equipment in order to develop knowledge of the application of lecture material; using pre-built industrial or laboratory equipment OR to construct and test circuits/assemblies/software programmes designed by the student. Activities will include demonstrations, laboratory experiments, construction-and-test exercises and projects. The practical sessions are timed to match appropriate elements of the lectures and may last for part of a lecture or the whole lecture.

Directed private study
A feature of this programme is that a significant amount of material will be delivered by means of investigative / research exercises, design and problem-solving exercises and by further reading. These activities will be directed by module lecturers via a scheme of assignments covering independent student study, supervised exercises (academic/practical) and group-based activities.

Industrial based activity
A significant amount of learning will be achieved in the work environment**.** Two modules are designated as Work Based Learning, spread over two years, with the intention being, to develop the student's practical skills, knowledge and understanding of the equipment, processes and methods of work. Some content would be directed toward H&S awareness, management skills and personal development planning. A comprehensive learning and teaching support mechanism will be in place, with a mentoring system assisting the students**'** development and monitoring progress.

Problem Based Learning
Students have the responsibility for their own learning through the provision of simulated or 'real world' problems which are facilitated through a lecturer's guidance.

Blackboard/ Moodle
Lecture notes, assignments, lab worksheets, individual progress report, module information etc. will be placed on Blackboard where and when appropriate. Some notes on specific modules of Aircraft Systems and Aircraft Structural Technologies have already been installed on Moodle at Glyndŵr University. Part 66 training notes are currently being developed on Moodle at Deeside College.

Guest Lecturers
Guest lectures will be implemented wherever possible, from aviation industrial experts.

Work Placements
During consideration of work based learning reference was made to QAA document on Placement Learning. It is initially anticipated that the bulk of the students will obtain industrial experience at their relative places of employment as part of their apprenticeship. As these programmes have already successfully run, to the satisfaction of both the companies involved to date, and the external examiner/bodies, the team have decided to adopt the same processes and procedures in running and management of the programme.

Industrial Experience
The programme team has put extensive consideration to the implications of the work experience. The scheme will involve 'Work based learning' and 'Project' as defined in module specifications to which reference can be made for further details.

As these students are all from industry and will normally be assumed to be apprentices or already in the field of aviation, the programme team have used the Airbus model in the programme whereby the modules stated above will use the working environment to enhance their learning and achieve the appropriate outcomes for the stated modules.

This involves a good working relationship with the employer to ensure the student is able to:-

- Have access to relevant company documentation
- Be able to observe and participate in tasks being performed
- Be given specific tasks by the employer that will help the learning process
- Work as part of a team to assist their learning.

The overall management of the work based learning will be overseen by the Programme Leader from Glyndŵr University. This will involve regular communication between Glyndŵr University, Deeside College Management, Deeside College Work Placement Supervisor/Mentor and regular meetings with the employer. There will also be an input into the assessment of the student by all parties. This involves people from Glyndŵr University, Deeside College and Employer representative being present during student presentations about their Work Based tasks to ensure authenticity and currency of information.

The Work Based learning modules of the programme will be supervised by a Deeside College member of staff who will act as the Work Placement Supervisor/Mentor and who also manages existing programmes within the working environment supervising other aircraft training for the company. This will be monitored under the supervision of the programme leader.

If a situation does arise that a student on the programme cannot have access to work placements the programme team would endeavour to assist the student in securing an appropriate placement in conjunction with the careers and work placement service at Glyndŵr University and Deeside College.

Placements within the company will be adapted to suit the demands of the foundation degree.

Supervising Tutor
A Work Placement Supervisor/Mentor (Member of Deeside College staff) has been allocated to a student group to monitor the two industrially-based modules (Work Based Learning and the Project) by interviewing students, monitoring development of practical skills, maintenance of logs, self-evaluation and production of reports. This will be carried out on a regular basis. The Work Placement Supervisor/Mentor and Training Co-ordinator from the appropriate company will provide the work based assessment of the students. Internal verification will enable a consistency of standards across the different groups and the whole will be co-ordinated by the programme leader.

The object of the Work placement Supervisor/Mentor is to:-

- Maximise the use of informal learning within the working environment
- Encourage the sharing of knowledge and expertise within the students employment
- Ensure the employer is committed to the promotion of the learners experience
- Develop the learners experience by encouragement of innovation and research
- Support the student in successful achievement of tasks by identifying targets and actions needed

In most cases it is anticipated that the students on the programme will come from large organisations such as Airbus and Hawker Beechcraft which will have people in the position of

training co-ordinator. However, interest in the programme has been shown by smaller organisations such as RDB, Hyde Engineering which only employs 20 to 60 people. Provided the work based mentor has sufficient time available he/she would supervise these students liaising with the company training department to ensure the student was provided with the quality of learning opportunities to carry out the task. If however this is not possible, a work based mentor would be identified to support the student within that specific working environment. In this instance, the work based mentor would be provided with training by the module leader to perform this specific role. The training will ensure that the mentor is made aware of the requirements of work based learning in the context of ensuring that students would have access to appropriate learning opportunities in order to meet the module learning outcomes. To ensure and maintain the standard required by the programme and to ensure that all students are treated equally, all work based learning assessment will be assessed by the module leader. Both Glyndŵr University and Deeside College have experience of training mentors to carry out this procedure and their procedures will be adopted.

On our existing foundation degree programmes a model adopted is for the Work Placement Supervisor/Mentor to visit the students at their place of work on a regular basis, but also to seek time, when the whole group is together on a college/university day, to address the group about issues which arise such as discussing submission dates to ensure commonality across the group.

Contact can be made by students with the Work Placement Supervisor/Mentor by using the College/University learning support systems of Moodle as well as e-mail. This year the innovative approach of using mobile texts has proved successful.

Records
Students will be responsible for logging work carried out and for preparing reports for the supervisor. These records will be countersigned by the supervising tutor/mentor during regular consultations. Attendance and time-keeping records will be maintained by the 'company' under the supervision of the appropriate company Training Co-ordinator.

Welsh Medium

In line with the University's Welsh Language Policy, students are entitled to submit assessments in Welsh.

Additionally the programme team would wish to develop the language skills of students taking this programme. The University already offers modules in Welsh as a second language at HE level to students studying degrees which involve working with the public e.g. social work, nursing, youth and community work. It is anticipated that students whose first language is not Welsh, or who wish to improve their Welsh skills (either an improver or a new learner) would be offered these sessions as an extra module outside the programmes. The University's investment in its Second Language Learning Centre ensures that this aspiration can be delivered from within existing arrangements.

Assessment strategy used to enable outcomes to be achieved and demonstrated

All aspects of assessment will be carried out in conjunction with the University's Academic Regulations relevant to Foundation Degrees.

Assessment Schemes
The assessments will be 100% in-course. The assessment scheme for each module will be defined and reviewed on an annual basis as a result of subject-team meeting. However, an initial scheme will be prepared to indicate the team's intentions.

In summary, the assessment activities will be from a range including, for example:

Investigative assignments - individual or group
Investigative assignments would entail the student doing research into given topics, normally the breadth of the research is identified within the assignment brief, the student should develop the depth of the study. This type of assessment is seen as being an important part of the learning experience, not just for the knowledge acquired from the study, but also the action of performing research helps develop the student's engineering capabilities. There will always be a problem that is confronted whereby a deficit in knowledge can be overcome by research. Sometimes a research assignment is given out as group work, the group sizes being between three and five. For such an assignment it is usual for the topic studied to be split into parts, each student being responsible for a particular section and jointly responsible for overviews, introductions conclusions etc. Hence the grading can properly reflect a particular student's contribution.

Formal report
Formal reports are a method of assessment used to provide evidence of practical work. They differ from laboratory reports in so far as the student has much more flexibility relating to the practical work undertaken. It is usual that the practical work accomplished between each student is different; hence this needs to be explained properly. The method of using a formal report aids the student to fully explain the work carried out as the layout of the report requires a set procedure to be followed; hence all information is conveyed properly to the lecturer for marking. The Project module is a typical example where this method of assessment is very useful.

Oral/visual presentations - individual or group
A number of modules require an oral visual presentation as part of the assessment. Quite often MS PowerPoint is used as the presentation 'tool' however it is not unusual for students to give a presentation just through verbal information and practical demonstrations. (This can be seen as observational assessment). There would be a marking sheet for each student which not only examines the presentation skills but also the pertinent aspects of the practical demonstration. For group work the assessment would be similar to that of the investigative assignments, whereby there is clear evidence of each student's involvement, also each student would be expected to take their turn for a part of the presentation.

Practical work or laboratory work
It can be seen from the other assessment methods that practical work is not limited to this method; however the way in which it is assessed differs slightly. There are usually a set of pre-determined practical tasks in a particular order which are identified in the Lab brief given to the student. The student evidences their accomplishments in the Lab report.

In class test
In class tests are time constrained and provide the opportunity for the student to demonstrate their absorption of knowledge in a particular field. They are usually used when there is a high

percentage of mathematics involved with the module. They tend to focus the student and promote revision, it is usual for some students to identify weak areas during revision weeks.

Individual logs
Logs are used to record work completed, they are a particularly useful form of assessment for some of the work based modules. They enable the means to produce evidence that particular learning outcomes are being achieved whilst performing normal job functions.

Portfolio of activity evidence
The portfolio would be very similar to the log; however it may also contain work that has been accomplished outside of the workplace or laboratory, particularly investigative work. Portfolios will contain progressive work completed over a period of weeks, months or whole semesters, they should evidence both practical work along with knowledge and understanding. Several modules are assessed using this method. The content of the portfolio would be relevant to the particular module. For the same module the content is likely to differ between students as it would be applicable to the student's place of work (even within the same company). For example the Health & Safety report required in the Work based learning module would require a section relative to SSW (safe systems of work) in order to satisfy the module learning outcome 1. This outcome could be achieved in a number of different ways depending upon the work environment and jobs in hand, each student is likely to produce a different SSW section.

All aspects of assessment within this programme are summative.

Progression to level five
Assessment for non work-based learning modules will be submitted to the Summer Assessment Board, and should any referrals/deferrals be identified at that point, students would have an opportunity to resubmit in time for consideration at the Autumn resit Assessment Board. The work-based learning modules would be submitted to the Autumn board as the first attempt. Should a Level Four student refer at that point, there may not be sufficient time for them to recover in order to progress to Level Five that year, and students would be offered the opportunity to progress to Level Five trailing the work based learning module. Additionally, there are formative assessment mechanisms in place throughout the year to avoid this situation happening.

Referrals
In the case of referred assessment, the student will be able to resubmit work on two further occasions (in accordance with the academic regulations).

Internal Verification and Moderation
Internal verification between Glyndŵr University and Deeside College is carried out using Glyndŵr University's documentation. Normal practice is for a second lecturer to check the assessment for correct level and in line with the syllabus prior to distribution to the students. Once the students have completed the work and it has been marked by the module tutor it is then second marked by the verifier who for Deeside College taught modules will be either a Deeside College colleague or a member of the Glyndŵr University staff.

Moderation of the work between the two sites is carried out by the programme leader visiting Deeside College on a regular basis. This is also carried out by the external examiner sampling work at both sites during his mid-year visit and also at the end of the academic year.

To ensure consistency of standards internal verification and moderation are also discussed at programme team meetings as well as listening to any feedback from the external examiner at the module board following his scrutiny of all assessment work from both sites prior to the event.

With the programme being delivered by both Glyndŵr University and Deeside College staff in both years and at both sites there is also the opportunity for staff to confer about assessment standards and requirements.

Indicative Assessment Schedule FdEng Aeronautical Engineering (Manufacture)

	Mod Code	Module Title	Ass 1	Ass 2	Ass 3	Ass 4	Ass Week Nos
YEAR ONE	ENGF 403	Analytical studies 1	Portfolio	In Class Test	Port-folio	In Class Test	8,15,25 30
	ENGF 404	Intro to Manufacturing and techniques	Assignment	Investigation			17 &29
	ENGF 405	Composites and Aero Materials	Report	In Class Test			10 & 30
	ENGF 402	Business and Quality Management	Written Assignment	In Class Test			12 & 25
	ENGF 407	Work based learning	Report	Report			1 to 30
YEAR TWO	ENGF 512	Analytical studies 2	In Class Test	In Class Test			9 & 30
	ENGF 511	Design and CAD	Written Assignment	Practical (using Pro-Engineer)			14 & 27
	ENGF 515	Advanced Manufacture and CAM	Lab Report	Practical			22 & 29
	ENGF 514	Aircraft Structural Technology	Report	In Class Test			12, & 26
	ENGF 513	Project	Project Proposal	Log	Presen-tation	Report	1 to 30

Assessment regulations that apply to the programme

Glyndŵr University regulations for Bachelor Degrees, Diplomas, Certificates and Foundation Degrees will apply to this programme.

Programme Management

Programme team

The programme will have a team comprising the Programme Team Leader and the staff involved in lecturing and tutoring on the course.

Dr.	Fawad Inam	Lecturer (Programme Leader)
Dr.	Kokou Dadzie	Senior Lecturer
Dr.	Zheng Chen	Senior Lecturer

Steve Byrne	Senior Lecturer
Olivier Durieux	Senior Lecturer
Natalija Vidmer	Senior Lecturer
Steve Higham	Lecturer, Deeside College
Nick Burdon	Technician Demonstrator
Robert Parry	PT Lecturer

Research, scholarship and professional activity
In practice, Engineering acknowledges that in a field where knowledge and technology are expanding at a tremendous rate, on-going staff development is a necessity. Staff members are therefore encouraged to undertake courses of study and become involved in other activities which will update their knowledge in their own subject areas, in doing so they will also assist in their own career development (CPD). A centrally - allocated budget is provided for this purpose.

Examples of such activities include:

i) New staff members undertake Postgraduate Certificates in Professional Development in HE as part of their induction.

ii) Attendance at seminars and on courses of various types. These may vary from a short course to a full year or more leading where possible to the award of further qualifications. For example, two staff members have attended a composites course with Airbus UK. Some members of staff have also attended seminars at Nottingham, Wakefield and Coventry to do with Foundation Degree development.

iii) Undertaking research at a personal level and/or the supervision of research students carrying out relevant research. A number of staff have carried out research in conjunction with students and presented papers at conferences.

iv) By undertaking consultancy work of a professional nature, the income for which continues to grow in Engineering. An example is the Knowledge Transfer Partnership. Managed and co-ordinated by a Principal Lecturer in Engineering, a number of KTPs (formally TCSs) have been generated. These aim to apply academic expertise to the solution of industrial problems within the framework of applied post-graduate research. Some examples of KTP's are:-
    - Improving the Quality Assurance systems at a local preserves factory and carrying out an examination of Product Development
    - Implementing a Lean Manufacture system at a local company and also reviewing the Quality Assurance systems
    - Involvement in the development of neural networks and automated control systems with United Utilities

v) Release from teaching duties to undertake a pre-defined programme of work within the university, at an industrial location or at another university.

vi) Involvement in relevant professional activities, including professional institutions. Members of the course team are active in regional professional institution committees.

Research and Scholarly activity underpinning the curriculum
Activities that underpin the curriculum:-

- Current technological input to the modules can also come from vendors and manufacturers of industrial equipment and systems. Many of these representatives,

whom specialise in particular fields, would be more than happy to give presentations/seminars at Glyndŵr University/Deeside College, as they see it as promoting future business.

- Industry is also willing, from time to time, to release engineers with specialised expertise, in order to deliver presentations to staff and students. This will enlighten the students in terms of industrial practices and enable them to compare what we deliver and what happens in 'the real world'.

- In the past the programme team have invited academics from international Universities/Institutes to visit and give presentations on their area of specialism such as:-
  - Developing welding technologies (Germany)
  - Developing composites and rapid manufacturing technologies (London)
  - Non Destructive Testing NDT (France)
  - Applications of Rapid Prototyping (Germany)
  - Deformation & Bending of Structures (France)

- Many of the programme team are members of professional organisations; as such we have access to numerous sources of information. Each member receives a monthly journal aimed at their specialism, this keeps the reader up to date and information is fed into relevant modules. For example there have been recent changes in safety standards relating to automated systems.

- As stated above some team members are supervisors/technical advisors/facilitators to KTPs / PhDs, which by the nature of the roles, ensure the staff are conversant with leading edge technologies and the Industrial practices employed. Staff use the experience gained to enhance the students' knowledge of materials testing in product manufacture.

- Membership of the Welsh Assembly Government "Aerospace and Defence Strategy Group." in terms of academia.

- Team members from both Glyndŵr University and Deeside College have recently attended a two day composites course at Airbus looking at A350 wing construction and repairs.

- Recently joined the North West Composites Consortium sharing information with other universities in the North West.

Staff Development Strategy
The staff development will be discussed between Glyndŵr University and Deeside College and will also share staff development opportunities between sites as well as discussing the possibility in employers offering training and courses in support of the programme. Staff development funding and departmental funding will be made available at both Glyndŵr University and Deeside College to support staff development activities. These activities may involve visits to conferences, seminars and exhibitions. Staff will also be encouraged to spend time on a form of work experience with Airbus and others when appropriate companies such as Airbus, Chevron and Hawker Beechcraft spending up to a week at a time in the environment. Staff training has also been discussed using Airbus multi-media package training pack (AMI). Computerised training package for aircraft manufacturing, aircraft systems and aerodynamics.

Quality and programme Management (in detail)
Existing arrangements for quality assurance will apply to the programme. Engineering has a

long history of the management and operation of quality assurance systems within the university's own QA systems including full involvement in validation and approval processes and to the annual monitoring and review procedures. In terms of the management of QA procedures within Aeronautical/Mechanical the following mechanisms will operate for the proposed course:-

- Programme Leader Annual Monitoring reports reported to Subject Team meetings and Subject Board.
- External examiner reports with reporting lines through Subject boards
- The use of formal and informal student feedback, incorporated into reporting procedures

Draft responses to External Examiners' comments are considered at programme level and approved at Subject Board prior to submission to the Examiner. After programme meetings to discuss the AMR they are forwarded to the Subject Board for further. After the Quality Strategy Committee has considered all of the university's AMRs then a plenary session is then held for the university to feedback on the their overall quality.

Programme Monitoring & Review
Programme monitoring and review is an on-going process involving everyone concerned with each programme. The Programme Leader and programme team will monitor the operation with input as necessary from student representatives. The role of student representatives is detailed further in other sections. In addition, there are two formal mechanisms for dealing with programme issues - the Programme Board and the Subject Board.

Staff Student Consultative Committee
SSCC's are held between two to three times a year to discuss a number of issues. Prior to the meeting an agenda is set and distributed to all participants. The meeting held with the students is minuted and actioned accordingly. A copy of the minutes is given to the class representative to disseminate the information back to the group. The points arising are then discussed at programme team meetings and issues minuted and if the matter cannot be resolved at this level, issues are discussed at other events such as Subject Team Meetings and Subject Board.

Academic Management
The academic management is overseen by the Academic Head of Engineering. The Academic Head will be present at most Programme Boards, Subject Boards and Assessment Boards to view the overall situation.

Subject Board
In summary, the board combines evaluation with quality assessment reports from the various programme boards within Engineering. Also, modifications to existing programmes and consideration of new programmes are formalised for consideration at the Subject Board. By this means matters requiring the considered attention of the university will be identified and actioned. Other actions may be identified; such as seeking responses from other departments within the university. Responses and actions are also passed back to the Programme Boards. Full details of the role of the Subject Team and Programme Boards are contained, together with university's Academic Quality Assurance Monitoring and Review structure.

Programme Board
The programme board consists of the teaching team, student representatives and representatives of other departments within the university. This will meet at least three times per year and will respond to the on-going needs of the course as they arise, reporting directly to the Subject Board, and university management when appropriate. Course evaluation will take place continually - consistent with the university scheme for Quality Assurance. An annual

evaluation report will be prepared to a standard format by the Programme Team Leader at the end of each academic year.

Issues which may be discussed at the programme boards are:-

- Staff Student Consultative Committee meetings
- Points arising from previous subject team meeting
- SPOCs
- SPOMs
- Assessment results
- Resources
- AMRs

Issues which cannot be resolved at this level are referred to Subject Board.

The programme team have responsibility for:-

- implementing recruitment and induction procedures ensuring equal access and equal opportunities policies are considered
- effective programme design, implementation of assessment strategies and student support systems
- effective liaison with employers
- implementing quality control systems:-
  - monitoring the operation of the programme
  - monitoring student progress
  - implementing review and evaluation procedures

The programme leader has particular responsibility for:-

- the effective operation and development of the programme team
- identifying future resource and team development needs
- planning and implementing detailed review and evaluation procedures which incorporate the views of all stakeholders
- providing the link between the programme team, students and the external verifier/examiner.
- student tracking and student records
- collation of assessment data, presentation of data at assessment boards and preparation of student transcripts
- quality assurance and annual monitoring
- internal verification and moderation

Each Module Tutor is responsible for:-

- The maintenance and development of learning and teaching materials for all students enrolled on the module.
- The setting, marking and collation of marks for all module assessments, including re-sit assessments, and submission of student results to the Programme Leader
- Support for students taking the module for which they are responsible
- Quality monitoring, including processing of annual student feedback questionnaires.(i.e. SPOMs)

Particular support for learning

Student Support
The learning support mechanisms available at both Glyndŵr University and Deeside College are:-

Information Services
Give guidance for or provide:

- Location of specific books, texts, journals etc.;
- IT assistance;
- 'How to Study' tutorial;
- Induction programme, relating to Information Services facilities.

Workshops

There are regular maths workshops/ tuition for Engineering students, intended for 'one to one' assistance with any mathematical related problem a student may be experiencing. It is intended to run a weekly academic clinic whereby assistance can be given for any academic related problem. This system can be implemented by arranging sessions with the maths support tutor for day release students

Access to Staff

Subject to availability students can meet lecturers without appointment to discuss any problems or ask for advice etc. They can also be contacted by phone or e-mail. Appointments can be made in advance where necessary / requested. Technicians also operate a similar policy, whereby they assist students with technical problems, advise on equipment operation, provide consumables, place component orders for students, etc.

Personal Development Planning (PDP)/ Personal Tutor

Normally each student has access to a personal tutor, part of whose role is to assist in the development of the student's PDP. All students have an opportunity to gain from PDP which forms a record of academic and personal achievements, and also demonstrates different skills/ knowledge acquired. It not only reflects upon achievements, but also identifies any weaknesses and difficulties. Students typically call upon their personal tutor when they feel that they require assistance to resolve any problem affecting their study at Glyndŵr University or Deeside College.

Due to the part time day release delivery method and structure of this programme it is anticipated that the programme leader will adopt the role of personal tutor for all students.

Student Feedback

Feedback from students is an important aspect of the teaching and learning process, as it gives the programme team an insight into the student's perception of the course generally and of particular modules. This can (and has for other FdEng programmes) influence aspects of the programme, in the form of module modification, or in some instances substituting or re-writing modules. This is done in such a way as to improve the teaching and learning methods yet still maintain the original outcomes and aims.

The formal methods of acquiring student feedback are explained in the Programme Management section, this provides the required 'evidence' for change. However informal general discussion with students also provides further awareness of learning difficulties and teaching methods can be adapted to overcome them.

Student representatives are nominated by their peers each academic year. These reps can

pass on the concerns of students in an 'anonymous' way. Student representatives are invited to programme team meetings to add the student perspective to discussions. Often, student reps are asked if they might wish to represent the subject they study at open days and public events.

Feedback to students

All assessment documents indicate the learning outcomes being assessed and the 'weighting' of the assessment in relation to the end grade for the module.

Marked assignments will include comments within the student's text and general, constructive comments on the marking sheet proforma. These would usually be shown to the student within three weeks of submission for viewing and discussion with the lecturer, on the understanding that these are indicative marks only at this stage. This type of feedback is essential in the learning process, as the student and lecturer can identify problems and steps can be taken to improve future work.

Learning Resources

Glyndŵr University's FdEng programmes throughout their existence have been well supported in terms of resources at both Glyndŵr University and Deeside College.

Numerous new books have been purchased at both Glyndŵr University and Deeside College over recent years to ensure current developments are incorporated into the programmes. There are several computer suites within Deeside College and Glyndŵr University with computers being replaced or updated, which enables modern software packages to be utilised in support of the lectures. A significant amount of new equipment has been purchased or donated for the laboratories/workshops over the last five years at both Glyndŵr University and Deeside College.

Further investment will be required in some areas. Although there has been past investment in books covering topics related to current provision, there is a requirement for books which cover the specialist topics/modules. Also laboratory equipment will require investment, again to meet the specialised topic needs. This will be progressive, with relatively small initial investment to meet the needs of the anticipated small cohort numbers in the first year. However further investment may be necessary if cohort numbers increase as significantly as market research would suggest.

It should be noted that some investment has already been made in specialised laboratory equipment, in anticipation of the programme running. Also, as mentioned elsewhere, donations of equipment from industry have already been made and will hopefully continue.

Classrooms

All lecture rooms and classrooms at both Glyndŵr University and Deeside College are allocated centrally and a variety of room sizes are available for capacities between 10 and 150. All of the rooms are equipped with white-boards and OHPs. TV/Video units are available.

Laboratories/Workshops

There are a variety of laboratories/workshops used by the engineering programmes at both Glyndŵr University and Deeside College. A summary list of the laboratories is given below. Practical work will utilise all of these laboratories.

Glyndŵr University Facilities

1 Project laboratory including:-
- hand-work benches
- machine tools
- CNC machines.
- welding equipment

2 Thermo-Fluids laboratory including:-
- vehicle/engine performance analysis facilities.
- flow channel

3 Structures / Physical science laboratory including:-
- framework apparatus
- buckling apparatus
- torsion apparatus
- bending of beams apparatus
- shear web apparatus
- pressure vessel apparatus

4 Aircraft laboratory including:-
- mark 3 Jet Provost
- kit aircraft
- static flight simulators
- hand-work benches
- pneumatics rig
- hydraulic rig

5 Aerodynamics and propulsion laboratory including:-
- sub sonic wind tunnel
- supersonic wind tunnel
- moving flight simulator

6 Materials laboratory and failures investigation suite including:-
- hardness testing
- tensile testing
- electron microscope

7 CAD computer room including the following software:-
- MD solids
- Fluent
- Pro Engineer
- Abacus
- Auto CAD
- Math CAD

8 CAE - general engineering computer room with similar software to above.

Deeside College Facilities

E22 Computer room
- AMIS (Airbus multimedia training package)
- AutoCAD

- Pennant Aeronautical CD based learning software.

G95 IT Suite

E20 Hydraulic Laboratory

E21 Pneumatic Laboratory

G65 Science/Material laboratory
- Tensile testing
- Small wind tunnel
- Hardness testing

EW2 Aeronautical Workshop including:-
- workbenches for practical work
- fully equipped A319 Port Wing)
- Jet Provost MK4
- Jet Provost MK5,
- Twin Engine Cessna 340
- General Electric CF6-6 Turbofan engine

Equality and Diversity

The programme design is relying on the students' involvement. The programme team believes that high learning outcomes can only be achieved through recognising the value of every individual. The proposed programmes aim to create an environment that respects the diversity of staff and students and enables them to achieve their full potential, to contribute fully, and to derive maximum benefit and enjoyment from their involvement in the life of the University experience.

To this end, the University acknowledges the following basic rights for all members and prospective members of its community:

- to be treated with respect and dignity
- to be treated fairly with regard to all procedures, assessments and choices
- to receive encouragement to reach their full potential

These rights carry with them responsibilities and the University requires all members of the community to recognise these rights and to act in accordance with them in all dealings with fellow members of the University. In this way, the programme complies with all relevant legislation and good practice laws stated in the University's equality schemes and equality legislation.