EMPLOYABILITY SKILLS & ENGINEERING

The following is an extract from the Employability and Enterprise Policy/Strategy:

The University has accepted the following definition of employability as articulated in ‘Future Fit: preparing graduates for the World of Work’ published by UUK/CBI (2009).

“A set of attributes, skills and knowledge that all labour market participants should possess to ensure they have the capability of being effective in the workplace – to the benefit of themselves, their employer and the wider economy”.

The University has agreed the following attributes as important in the development of an employable graduate: self management; team-working; business and customer awareness; problem solving; communication and literacy; application of numeracy; application of information technology. Definitions of these are:

Self management – readiness to accept responsibility, flexibility, resilience, self-starting, appropriate assertiveness, time management, readiness to improve own performance based on feedback/reflective learning.

Team-working – respecting others, co-operating, negotiating/persuading, contributing to discussions, and awareness of interdependence with others.

Business and customer awareness – basic understanding of the key drivers for business success – including the importance of innovation and taking calculated risks – and the need to provide customer satisfaction and build customer loyalty.

Problem solving – analysing facts and situations and applying creative thinking to develop appropriate solutions.

Communication and literacy – application of literacy, ability to produce clear, structured written work and oral literacy – including listening and questioning.

Application of numeracy – manipulation of numbers, general mathematical awareness and its application in practical contexts (e.g. measuring, weighing, estimation and applying formulae).

Application of information technology – basic IT skills, including familiarity with work processing, spreadsheets, file management and use of internet search engines.

Underpinning all these attributes, the key foundation, must be a positive attitude: a ‘can-do’ approach, a readiness to take part and contribute, openness to new ideas and a drive to make these happen.

SO

HOW WILL THESE SKILLS BE DEVELOPED THROUGHOUT YOUR ENGINEERING DEGREE?............
OVERVIEW OF ENGINEERING COURSES

Whatever your chosen specialisation within the suite of Engineering subjects taught at Cardiff University, most, if not all, of the employability attributes will be present in your course of study. These will often appear as an *explicit* part of particular modules, common to all Engineering students in the first two years of their course (whether a 3 year B.Eng or a 4 year M.Eng); they may also occur as specific option choices in the latter part of your studies. In addition to this, and overarching everything, the intellectual rigour which accompanies the Engineering Disciplines requires the frequent exercise of the whole range of employability skills outlined above. Although their overt presence might not always be immediately apparent, employability skills form an *implicit* and important part of your academic and practical work.

Many engineering students exercise the option to spend a year in industry between years 2 and 3 of their academic studies. A Careers Management Skills (CMS) course is run within the School to prepare placement candidates for this experience of working in a professional engineering environment. In addition, they can register for the Senior Award of Licentiateship with the London City and Guilds Institute, which recognises work-related competence and expertise. Dependent on the nature of the placement, the experience gained may also be counted towards the process of achieving Chartered status with the appropriate engineering institution.

**So why is this significant?**

Many students assume that employers of graduates (whether within Engineering, or in an unrelated field), will have a clear understanding of their technical knowledge, and also of the associated good practices acquired in the course of their degree (ie the employability skills previously listed). Such is frequently not the case, however, with the unfortunate corollary that some very able graduates are not always initially considered for graduate level jobs.

**Communication and literacy:** Continuously developed through report writing throughout the course, and particularly as part of the Professional development and communication skills in English module in Year 1. Project work and dissertation material must be expressed in clear, grammatical English, as well as written and referenced in an appropriate style. Verbal presentation techniques and question/answer skills are also practised, particularly in group design report scenarios.

**Business and Customer Awareness:** All students study the application of the principles of Economics within a business and industrial context, which forms part of the Introduction to Economics, Law, Accounting and Management Science module.

The practice of Business management is studied in some depth by all students in Year 3, covering such topics as business strategy and intellectual property, examples being drawn from engineering and non-engineering contexts. Throughout their courses, students attend guest lectures given by business leaders and practising engineers, as well as participating in recruitment events such as the 3 day Engineering Fair organised by the Careers Service.
Self-Management: Engineering courses are intensive by nature, with a heavy and concurrent timetable of lectures, projects, tutorials and laboratory exercises. The careful husbanding of available time is crucial to maintaining progress throughout all the degree schemes, and students become adept at managing their workload to ensure the best overall result. Students also maintain a Professional Engineering Record during their time at University, which allows them to maintain an overview of what they are learning in the context of the course as a whole. This takes the form of a reflective log, which is periodically reviewed.

Team working: Collaborative working takes place throughout each course, typically in the form of design/make/test exercises in the first year and in more complex design projects in subsequent years. Students are not always able to choose with whom they may work, and this can be a useful rehearsal for projects in the future. Marking schemes are structured to take account of individual contributions to the team, as well as allocating marks for the team as a whole.

Problem Solving: The nature of all engineering courses is rooted in problem-solving, and students are exposed to this in a variety of ways. Typically, these include applying their new knowledge to examine how forces are absorbed in simple structures, to tackling ground clearance issues arising from the design of the suspension system for the Cardiff “Formula student” racing car design. Techniques such as brainstorming are regularly practised, which encourages a lateral thinking approach to design problems. In the later stages of each course, design /problem tasks are much more open-ended, so that systematic skills in problem definition are developed as well.

Application of IT: Students are exposed to the application of relevant, specialised programs throughout their course, particularly those related to the Design process (e.g. AutoCad 2D, PATRAN, Mathcad etc). However, the use of these programs is founded upon knowledge of the engineering principles which underpin them.

Programming in C++ (a widely used object-oriented language) is taught on all the Engineering courses at Cardiff. Students are widely practised in the use of Microsoft Office products, as part of their day-to-day work submissions.

All Year 2 students participate in workshops to enhance their skills in finding, evaluating and using high quality information in their work. Amongst other information resources, online bibliographic databases such as Scopus, Web of Knowledge and Ei Compendex are explored.

Application of numeracy: Mathematics and the manipulation of numbers form the basis of the language of Engineering, so students naturally develop an increasing fluency in their use, to a very high level. Whilst engineering students might be expected to perform well in the basic arithmetic tests often employed during graduate selection exercises, this is not universally the case, which can cause some bewilderment. Such tests are completed against strict time limits, so the need to understand how to perform well within time constraints, is crucial.
CAREER MANAGEMENT SKILLS (CMS)

CMS sessions delivered in years 2 and 3 will show you how to make sense of the employability skills developed throughout your degree and will help you articulate these skills effectively on paper and at interview to an employer. This link between academia and employment is essential, especially for those wanting to enter employment straight after their study. The Careers service is available to help you further with this throughout all stages of your academic degree.

The Careers service has a full programme of fairs, employer presentations and employer led skills sessions that give undergraduates opportunities to meet employers and start developing their commercial awareness skills. Furthermore, this insight will allow you to better prepare for the job search and application process.