Abstract. The paper describes an undergraduate curriculum in software engineering which has been developed in close consultation with the software industry. The UK context of such a programme is described and compared to the position in the USA. The programme is noteworthy for its emphasis on design, the use of Ada as the main programming language, and the emphasis on quality.

1 Background

1.1 UCW Aberystwyth

The University College of Wales, Aberystwyth (UCW) is the oldest of the six constituent colleges of the University of Wales. The structure of the University is comparable to that of multi-campus state universities in the USA. Aberystwyth is a small and isolated town on the coast, some two hours drive from the nearest centres of industry and population, and much further from the main centres of the IT industry. The main industries of the surrounding area are agriculture and tourism.

UCW has about 3000 students; almost all of them are full time and almost all of them have their homes elsewhere.

1.2 Students' Previous Experience

Students come into the programme with a very wide range of computing experience and education. The typical entrant is an 18 year old with two years of calculus, algebra, trigonometry and statistics in high school, as well as probably two years of physics; in addition, he or
she probably has some experience of using a microcomputer and of programming, usually in Basic but possibly in Pascal.

However, it would be undesirable to restrict entry to students with this background and many come into the programme with no computing experience at all and with no physics and only basic arithmetic and algebra. At the other extreme, some enter with considerable programming experience in several high level languages and in assembler.

A very important constraint in the design of the programme, therefore, is that it should be accessible to those with no relevant background while presenting a worthwhile challenge to those with extensive relevant experience.

1.3 Degree Programmes in England and Wales

The pattern of undergraduate degree programmes in England and Wales is very different from that in the USA or continental Europe. Although there is some provision for part time studies, the overwhelming majority of students complete their bachelor’s degree in three full time years in college, possibly interspersed with periods of industrial training.

Students have much less freedom over their choice of courses than in the USA and spend a much larger proportion of their time studying their main subject. At UCW, a Software Engineering student will spend one third of the first year studying Software Engineering, two thirds of the second year and the whole of the third year; a further third of the first year is spent studying Mathematics and the choices available for the other non-Software Engineering portions of the programme are comparatively limited. Within the Computer Science component, it is only in the final year that students have any real choice over the courses they study. In other universities, it is common to find that there is no choice of subjects at all, outside the main degree programme.

While it can certainly be argued that courses based on this pattern are undesirably narrow, it does mean that the level of knowledge and attainment in the major subject is likely to be perceptibly higher than in a broader course. Very roughly, a student on the Bachelor’s programme at UCW will spend the equivalent of 72 credit hours studying Software Engineering and a further 36 studying allied topics such as Mathematics, Microelectronics and Accounting. Because of the level of the Bachelor’s degree, employers attach comparatively little value to a Master’s degree.

1.4 Validation of Degrees

There are two main ways in which degrees in the UK are validated: by the use of external examiners and by accreditation by professional bodies.

1Scotland is rather different in this respect.

2Although the programme is designed as a Software Engineering programme, for marketing reasons it is still designated as a BSc in Computer Science. For cultural reasons, many British students have been reluctant to embark on courses whose title includes the word ‘engineering’ but it is hoped that this attitude is changing.