

Manufacturing Industry and Energy Management

A summer school was held in the Faculty of Applied Science of University College Cardiff and was attended by twenty boys and ten girls from first-year sixth forms mainly in Wales, although a few came from schools in England.

Pre-Course Data

Selections for the course were made according to the criteria expressed in past reports, and resulted in pupils of very high ability, nearly all having achieved five or more grades A in their GCE O-level examinations. One improvement in pre-course status, noted before the course began, was that twenty-nine of the pupils were studying some form of A-level mathematics and the 30th were very soon persuaded of the need to try to alter her situation! Twenty-seven were studying physics and twenty-one chemistry. In light of the recent decision of the Council of Engineering Professors to accept an engineering-orientated technology examination as fully equivalent to A-level mathematics or physics as an entry qualification to university courses, it was pleasant to note the presence of our first-ever student currently studying technology for the Diploma of the TEC. Nine were studying A-level biology and one each computer science and English.

It is disturbing to hear that only eight students reported that their schools offered an engineering or other applied science subject. Perhaps this was reflected in the answers to a post-course questionnaire in which the students said the advice they would offer a younger, technologically-minded pupil was to study pure mathematics, physics and chemistry, in that order of preference.

Before the course only five pupils felt that they knew enough about university courses to make a second choice of subject — which they will have to do in the autumn for the UCCA selection. It is interesting to note that before the course started twenty-four pupils said they did not know enough about industry to make a career choice, although seventeen already intended to make a career in industry, and only seven expressed the contrary view.

Experience of manufacturing industry figured in seventeen of the replies received, only one having had individual work experience. Five had been on class visits, three had talked with the Careers Advisory Service, ten had received careers literature and a dozen had heard visiting speakers from industry.

Post-course data

On the last day of the course twenty-nine of the pupils returned completed questionnaires which recorded their reactions to the summer school. This document was twice as long as the pre-course questionnaire and was divided into three parts, the first dealing with the attitudes to, the second the content of, and the third allowing space for free comments about the summer school and suggestions for improvements.

Attitudes and experience. Only one reply indicated that the student was not considering a degree course in the broad field of engineering, applied science or technology, and in two-thirds of the cases, a decision to take a technological degree was taken during or before the first-year sixth form. All but three had decided not to enter industry without going on to a further/higher education. Just over a third declared that their views had altered as a result of attending the course. Most of the affirmatives indicated that they had gained considerable insights about the variety and interest provided by careers in engineering or applied science.

Only four pupils declared that not every school should offer a sixth-form option in engineering/applied science, and this informed pupil opinion clashes sharply with the state of affairs as reported by them on schools. Over two-thirds of the replies indicated that they felt that they would have benefitted from industrial experience, visits or talks at the fifth-form level or earlier.

Structure and content of summer school. It appeared that over 80% of the students found the course to be what they had expected from the literature, although one appeared only to have seen the application form with no other details! Most found the lectures easy to moderately difficult and one said they were too difficult. The practical sessions were mostly found to be interesting and the industrial visits 'about right'. If all the free comments were acted upon one feels that the course would last two weeks or more, and that everyone would go on all the six visits instead of just two, and would do practical work in all the departments! The division of time between the various aspects of the course was found to be about what was wanted, but several remarked how intensive the course was and how little free time they had. Perhaps it is no bad thing that the impression carried away from university is one of prolonged, intense activity! An interesting suggestion was that departments might consider holding problem classes instead of practicals, and this, linked with a similar plea from another student for more problems, leads one to suggest that lecturers in the morning sessions might consider giving out problem situations on paper for the pupils to discuss and argue about in their (limited!) free time. Such as are already set are very well received. Perhaps the Open Forum might provide an opportunity for solutions to the problems to be proffered and discussed.

The course members were asked to evaluate all the main lectures and other events on a 5-point scale. These were averaged and the highest and lowest ratings were 4.2 and 2.5 with a mean of 3.4. It is refreshing, again, to note that the course dinner and the theatre visit scored 3.8 and 3.6 respectively compared with lectures on energy microelectronics,

	8.00 9.30	10.30 10.45	12.00	1.0- 1.45	2.00 p.m. onwards	5.00 6.30 7.30
					Arrival Senghennydd House	Introduction to course and UCC
Sunday						
Monday	Opening lecture: 'Energy & Industry'	Opening lecture: 'Microelectronics in Manufacturing Industries'	'A' Pre-visit briefing 'B' Intro to Department 'C' Pre-visit briefing	Dept A Dept B Dept C	Visit to Aberthaw Cement Works Practical – Electronics Visit to Rolls Royce, Filton	7.30-9.00 Informal tutors groups (ALL) Opening Windows on Engineering
	Prof B. Brinkworth	Prof M. Healey				
Tuesday	Lecture: 'Civil Engineering – Successes and Failures'	Lecture: 'Some aspects of generation and transmission of electrical energy'	'A' Intro to Department 'B' Pre-visit briefing 'C' Intro to Department	Dept A Dept B Dept C	Practical – Civil Engineering Laboratories Visit to CEGB Power Station Laboratory practical	7.30-9.00 Informal tutor groups (ALL) University staff
	Dr H.R. Evans	Dr V. Cook				
Wednesday	Lecture: 'The Engineering – Is he Human?'	Lecture: 'The Structure of Materials'	'D' Pre-visit briefing 'E' Intro to Department 'F' Pre-visit briefing	Dept D Dept E Dept F	Visit to The Royal Mint Practical – Microbiology Laboratory Visit to NCB Open Cast Mine	New theatre New Theatre
	Prof E. Markland	Prof H.K.M. Lloyd				
Thursday	Lecture: 'Microbiology and Energy'	Lecture: Development of new coal mining projects'	'D' Intro to Department 'E' Pre-visit briefing Department	Dept D Dept E Dept F	Laboratory practical Visit to Cleppa Park Practical – Mining Environmental Engineering	Course Dinner
	Prof D. Hughes	E.C. Hellewell				
Friday	Lecture: To be announced	Open forum			DEPARTURE	

BREAKFAST – University Union

COFFEE – Foyer of Mineral Exploitation Department

LUNCH

FREE TIME/RETURN FROM INDUSTRIAL VISITS

DINNER IN UNIVERSITY UNION

KEY TO DEPARTMENTS:

- | | |
|---|------------------------------------|
| 1st half | 2nd half |
| A Civil & Structural Engineering | D Metallurgy and Materials Science |
| B Electrical & Electronic Engineering | E Microbiology |
| C Mechanical Engineering & Energy Studies | F Mineral Exploitation |

materials and 'What Engineering is Not', which all scored higher. Perhaps it is fitting that the introduction, which was mainly administrative with a film, scored the lowest! From the point of view of administration, several commented on the need for better maps and directions – although it was noted that all 30 were seated in the Students' Union eating their supper on the first day within 8 minutes of the appointed time, and that only 4 latecomers had found some difficulty in locating the room for the first lecture.

From the large number of suggestions received about topics, by far the most referred to the lack of chemical engineering in the course. The organisers are left in a quandary here; would it be right to import expertise from outside the College for this? We have no department of chemical engineering at UCC and there are other, less well-known branches of engineering which also have escaped the net – aeronautical engineering, aerospace engineering, nuclear engineering to name but three others (also requested).

Finances

The previous summer schools were partly funded – from the Department of Industry with pump-priming grants. This year we found that all good things come to an end and perforce had to approach very many industrial concerns for financial support. This we did by asking for sponsorships for a few student places each. Although we were initially doubtful that we would be able to survive, a few cheques were received even while the course was running and the total enabled us to support a course for the full number of 30 pupils. Mostly, the sponsors allowed us free choice in selecting the pupils, but in a few cases they were anxious to sponsor named students in selected schools. We accepted, reluctantly, this

tie, but always with the proviso that the nominees must take their chances along with the remainder of the applicants and might be rejected along with their sponsorships if they did not meet our published criteria. In the event we found no disparity in the selections. The overall cost per student was around the £75 mark, of which parental contribution of £10 each was made. The moneys received covered accommodation, board, transport within the course, secretarial and administrative costs and the course dinner. Students had the option of going on a theatre visit for which an extra charge was made. In a question regarding student contributions towards the costs of the course, 17 replied that £30 each would be a fair charge, the remainder being equally split between £10 and £50 as course fees. The services of lecturing staff, technical staff and laboratory facilities were provided free by the people and departments concerned.

Conclusions

It would appear that the course still meets needs expressed by students to know more about university life and course details, and much more about industry and technological careers than they can find out from schools. Perhaps this reflects a situation in which schools school, in the main, isolate themselves from the realities of the outside world despite the avalanche of persuasion from outside sources such as Young Engineer for Britain Competition, The Industrial Technologies Symposia, Modular Courses in Technology and even Tomorrow's World.