

Engineering education world

Contributions are invited for this feature. News items on policies that concern the engineering education world, new courses and curricula either of a unique nature or of international interest, new innovative laboratories and concepts, funding news for engineering research projects involving international participation, special international continuing education courses and news, industry-university interaction, engineering faculty news, and developments in engineering education of international interest. Please send news items and conference information to the Editor-in-Chief. Public relations offices of universities and human resources divisions in industry are requested to contact the Editor with news items concerning engineering education and training.

World

Internet security endangered

A new name for computer hackers who are tampering with Internet is 'crackers'. Computer security experts have detected a series of sophisticated attacks on the infrastructure of the global Internet network. They are assaulting technologies associated with the regional networks connecting universities to the Internet and which serve as hubs for companies that provide access to individuals. These attacks can give intruders the facility to intercept messages, change them or deny access to clients. Such intrusions in electronic mail have been known for some years but the degree of sophistication of the crackers has reached new dimensions, according to the Computer Emergency Response Team (CERT) at Carnegie-Mellon University in Pittsburgh. At present a race to resolve the problems is on, and unless solutions are found soon, restrictions may have to be imposed on the users of Internet, which will also affect the crackers. In the most recent series of attacks crackers have aimed at two sensitive technologies: Domain Name Servers and routers. A Domain Name Server is a computer that converts Internet addresses from words to numeric characters and vice versa. The routers break down the information into encoded packages and guide the packets to the destination where the information is reassembled. CERT is one of the organizations dealing with these problems. In particular, also with so-called 'sniffers' who capture

passwords of individual accounts. The sniffers are a lower-level threat than the crackers, as the intention of the crackers may be to gain information on the Internet infrastructure for commercial espionage purposes.

Europe

Women at the top of EU science and environment

The former French Prime Minister, **Edith Cresson**—well known for her comments on the sexuality of British men—is the new Science Commissioner of the European Union. She is taking over from Antonio Ruberti in January 1995. The new environment commissioner is the Danish **Rin Bjerregaard**. She is responsible for nuclear safety, including the reactors of eastern Europe.

Europe backs multimedia and communications research

The European Union is to support interactive digital multimedia to the tune of Ecu 162 million in its new fourth framework programme. Multimedia is funded under the Ecu 630 million advanced communications technologies and services programmes. Other high-priority topics are photonics, mobility and personal communications networks, and quality, security and safety of communication services. Also favourably supported under the programme are materials technologies, non-nuclear energy sources and socio-economics.

Tomorrow's world needs interdisciplinary executives

Fifteen European universities have teamed together to establish a master's degree course in society, science and technology. The degree offers studies on the relationship between these disciplines, and is meant to be an integrating exercise using interdisciplinary didactic methods. Participants include the Ecole Polytechnique Federale, Lausanne (EPFL), Athens School of Public Health, and the universities of Bari, East London, Oslo, Madrid and Siena. Pure subjects are not taught but are related to and combined with other issues. Such concepts, better known in the USA, UK, Denmark and The Netherlands are new to countries such as Switzerland. **Pierre Rossel** of the EPFL says that a lack of global training in decision making has inspired the project. Specialists are unable to relate to other specialists. The one-year course has two semesters. The first semester is common to all 15 participating campuses, with subjects such as the makeup of modern society, new technologies and the politics of science. The second semester is different on each campus. Subjects include management of biomedical technologies in Athens, innovation management in Madrid, and science, society and technology in a historical perspective in Bari. After completing the course the students take six months to write a master's thesis. Thesis topics already taken up by the students are resource planning for energy distribution companies and technology transfer to eastern Europe.

Eastern European salaries again

In Vol. 8 no. 6 we published a table from December 1992 of salaries of eastern European public sector employees, showing the income gap between Western and reformed countries. New figures are now available from June 1994. Surprisingly, Bulgaria and Romania, have even lower equivalent salaries than in 1992 (Table 1). Percentage-wise Albania, Lithuania, Estonia and Latvia have the largest gains. These countries also started from extremely low bases. The highest pay is in Hungary, the Czech Republic and Poland. These three countries have the fastest economic growth, followed by the Slovak Republic. There is also considerable investment in these countries from the West. The figures show that academic staff from these countries need to be supported by hard currency sponsors when staying at Western institutions. The table was published by the European TEMPUS programme as a guideline for supporting academic staff under the programme.

United Kingdom

Course bridging before collapse

Plans for making research students take a year to make a 'master of research' before embarking on a higher degree, advocated by a government policy White Paper, face extinction. All students were

supposed to spend the year learning how to do research and finding out whether they are suitable for it. The course was to include organization, management and communications studies. Senior officials of the Ministry of Science and Technology have received hundreds of critical comments on the proposed scheme. The Conference of British Industries commented that those who left higher education with just the MREs would be categorized as failed Ph.D. candidates. A reduced scheme is now going to be started in autumn for 250 students, but not as a compulsory course for all students as originally intended. **Michael Powell** of the Committee of Vice-Chancellors and Principals views the plan as a 'taster' course for those who are unsure of whether to take up research.

Germany

Struggle between higher education and states on funding

Funding conditions for new ventures and reconstruction of universities and colleges are going to be tougher in the coming years. Non-technical service courses are advocated by pressure groups from the social and service sciences in order to meet the coming demand for service industries such as tourism, trade and health. Engineering student recruitment in the hard-core engineering subjects has been in decline in the past two years (see **Wiebe and Wald**, Trends in recruiting mechanical engineering students, *Int. J. Engng Ed.*, 9, no. 5). With dwindling funds, some institutions are considering size reductions for their traditional engineering courses in mechanical and electrical engineering. As considerations tend to relate to quantity rather than quality, these trends may auger catastrophe for an industrial economy. Policy direction changes are especially critical for institutions with mixed technical and non-technical faculties due to a common anti-technical leaning of parts of the faculty.

France

Overspending crisis in science

Spending on science in France has been trimmed by 2% this year. A constant reduction in science support is feared by French scientists who are protesting against the cuts. The director of the CNRS, the largest research organization, claims that the organization has been living beyond its means. The 1350 CNRS laboratories have been instructed to cut their expenditure down to 60% of what they were told they would have at the start of the year. The organization has a budget deficit of 500 million francs, of which 360 million have been allocated from reserve funds to cover the gap. Scientists are angry at the CNRS management and claim that there is a plan to restructure the way the organization works. The former director of CNRS,

Table 1. The net monthly salaries in the public sector (ECU)

Professions/countries	ALB	BG	CZ	EE	H	LV	LT	PL	RO	SLO	SO
Technician											
December 1992	21-24	44-74	160-224	33-40	155-220	24-25	13-23	-	39-42	349	110-160
June 1994	40-45	30-35	140-195	74-108	228-288	57-105	36-50	-	28-37	336	120-175
Increase (%)	+89	-45	-13	+149	+37	+230	+166	-	-20	+4.8	+9.3
Head of Department (professor)											
December 1992	32-36	88-132	215-289	54-69	333-524	35-38	27-48	263-306	64-81	621	175-240
June 1994	100-110	80-90	245-355	155-212	512-736	100-225	104-162	290-336	52-64	645	190-250
Increase (%)	+201	-23	+19	+198	+45	+345	+255	+10	-20	+3.9	+5.5

1 ECU = US\$1.2.

ALB = Albania, BG = Bulgaria, CZ = Czech Republic, EE = Estonia, H = Hungary, LV = Lithuania, LT = Latvia, PL = Poland, RO = Romania, SLO = Slovenia, SO = Slovak Republic.

François Kourlitsky, says that the financial problems are not management related, and supports the allegations that the whole structure of CNRS is up for reform.

Finland

Polytechnics on the march

As in the Czech Republic and Poland, the Finns have also decided to supplement their university education with 3-4 years of more practical, vocational technical higher education. The development is focused on 22 temporary polytechnics formed from 85 college-level vocational institutions. At the same time the universities are undergoing severe budget restrictions with funding pouring into the new polytechnics. Courses include business, technology, design and forest technologies. All studies will undergo 6-month internships and strong international ties are planned for. Emphasis will also be on more industry orientation during studies so that graduates will have a short lead-in time upon employment after graduation.

Czech Republic

The trend towards higher vocational training colleges

The Czech Republic is planning to create vocational higher-education institutions. As in Poland and other countries such as Finland (see above) the cumbersome and expensive 5-year courses are increasingly under pressure from industry to produce more immediately employable, not theory oriented graduates. The system already exists as the foiskola in Hungary and the Fachhochschulen in Germany. The creation of 21 so-called upper vocational schools is planned. In addition, the country plans to introduce tuition fees, to cover up to 20% of the costs for higher education. The trend towards the upper vocational colleges may be vital for the countries at the periphery of the European Community, as due to low production costs, production, quality control and marketing functions to be carried out by engineers will be in demand.

USA

A new book on building high-tech classrooms

High-tech multimedia classrooms are increasingly becoming a feature available at many campuses. Professor **Susan Stuebing** of the New Jersey Institute of Technology has investigated facilities at over 40 campuses the world over. She has published a book which includes details, photographs, and blueprints for facilities of high-tech classrooms. The book, *Campus Classroom Connections: Building with Information Technology, A Case Study Guide of Higher Education Facilities*, is available at \$25 from: Campus Classroom Con-

nections, Architecture and Building Science Research Institute, NJIT, University Heights, Newark, NJ 07102, USA.

Conferences

International Conference on Simulation in Engineering Education

15-18 January 1995
Las Vegas, NV, USA
Contact: Magdy F. Iskander
Electrical Engineering, University of Utah
Salt Lake city, UT 84112, USA
Tel: +1 801 581 6944 Fax: +1 801 581 5281
ex-mail: iskander@ee.utah.edu

ICTE Orlando: 12th International Conference on Technology and Education

28 February-3 March 1995
Orlando, FL, USA
Contact: Tom Sechrest
Continuing Education Program, University of Texas
Austin, TX 78712, USA
Tel: +1 512-471 4080 Fax: +1 512 471 8786
e-mail: sechrest@mail.utexas.edu

CAL 95: Computer Aided Learning in Education

10-13 April 1995
Queens' College, Cambridge, UK
Contact: CAL 95 Secretariat
University of Cambridge Computing Service
Pembroke Street, Cambridge CB2 3QG, UK
Tel: +44 223 334600 Fax: +44 223 334679
e-mail: CAL95@ucs.cam.ac.uk

Sixth World Conference on Continuing Engineering Education

8-12 May 1995
São Paulo/Rio de Janeiro, Brazil
Contact: Professor Edith Ranzini
Escola Politecnica-EPUSP
Caixa Postal 8174
01065-970 São Paulo-SP, Brazil
Fax: +55 118137415 e-mail: wcce95@lsd.usp.br

5th International Forum on Technology and Management

5-8 June 1995
Espoo, Finland
Contact: Anne Heaton, Director ETMI,
93 Hampton Hill, Middlesex TW1 2HQ, UK
Tel: +44819779033 Fax: +44819433763

American Society for Engineering Education Annual Conference

25-28 June 1995
Anaheim, CA
Contact: ASEE
1818 N. St. NW, Washington DC 20036, USA
Tel: +1 202 331 3500 Fax: +1 202 265 8504

International Congress of Engineering Deans and Industry Leaders

3-6 July 1995

Monash University, Melbourne, Australia

Contact: Professor Z. J. Pudlowski

Faculty of Engineering, Monash University, Caylton, Victoria 3168, Australia

Tel: +61 3 905 4977 Fax: +61 3 905 6069

e-mail: zjp@eng.monash.edu.au

AI-ED 95: 7th World Conference on Artificial Intelligence in Education

16-19 August 1995

Washington DC, USA

Contact: AI-ED/AACE

PO Box 2966, Charlottesville, VA 22902, USA

Tel: +1 804 973 3987 Fax: +1 804 978 7449

e-mail: aace@virginia.edu

International Conference on Engineering Design: ICED Praha 1995

22-24 August 1995

Prague, Czech Republic

Contact: ETH—Swiss Federal Institute of Technology

ICED-UNO, CH 8028 Zürich, Switzerland

Tel: +41 1 632 2431 Fax: +41 1 262 0211

CAEE 95: 3rd International Conference on Computer Aided Engineering Education

6-8 September 1995

Bratislava, Slovakia

Contact: Conference Secretariat

Slovak Technical University, Microelectronics Department

SK-81219 Bratislava, Slovakia

Tel: +42 7 723486 Fax: +42 7 723480

e-mail: caee95@elf.stuba.sk

Fourth World Conference on Engineering Education

15-20 October 1995

Minneapolis—Saint Paul, MN, USA

Contact: Dr E.R. Krueger

William C. Norris Institute, 245 East Sixth St.

St Paul, MN 55101, USA

Tel: +1 612-225 1433 Fax: +1 612 225 1241

e-mail: wcnrex@epx.cis.umn.edu

Active and Productive Learning in Higher Engineering Education

1-4 November 1995

University of Twente, The Netherlands

Contact: Huib J. van Oort

Department of Mechanical Engineering,

University of Twente

7500 AE Enschede, The Netherlands

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EPSRC'S EFFORTS

In many respects the considerations above have been seen and noted by government (through the EPSRC's Engineering Board's Education and Training Committee) as important, and in the existing Integrated Graduate Development Scheme (IGDS) and the new Parady D.Eng. courses these are largely being met. In the IGDS scheme, graduates (usually) in employment are recorded for weekly residential blocks of instruction provided by universities. About 15 of these modules are taken over two years; these are passed and approved with a written report of a project completed in the workplace, mean that the university

in these days of financial stringency, it is not only possible we have all at least been given the opportunity to pause and consider whether such provision is correct, and to question its basis. Indeed, if instead of considering the quality we record our attention onto the output of the courses, then the possibility of maximising the output of a course will give us a very different set of criteria by which to judge the success of higher education for engineers. Although complete control of university courses according to industry needs is unhealthy, having due consideration for the requirements of industry is nevertheless vital.

If the push of students is to be supplemented by the pull of industry, in demand for instance, post-graduate courses and their content, two well-established facts have also to be pondered.

In science and engineering recorded knowledge doubles about every 15-17 years. Thus all recorded knowledge throughout history up until 1975 has since then more than doubled, and will double yet again by 2010. This means that typical graduates will have only been exposed at best to about one-sixth of the knowledge they will need to use during their careers. For some areas like medicine and law, the growth factor in knowledge is even greater, so that over a typical career in these subjects it is 15-20x it is not surprising therefore that about one-third of the