

2. Career Development and Accreditation of Chemists

(1) The current trend of chemistry education at higher education institutions

In view of the necessity to further develop the European Higher Education Area – due to the demands of European research and the changes in the international labor market – the GDCh supports a consistent, well-coordinated and rapid introduction of Bachelor and Master degree programs in chemistry.

In Germany 1998 a new Higher Education Framework Act passed, which gives the higher education institutions (in Germany: universities and universities of applied sciences) the opportunity to create new courses with international degrees. The Higher Education Framework Act takes care of globalization of industries and changing demand of the markets.

The new courses should have

- a minimum of a three year basic curriculum in chemistry. The first main cycle, the undergraduate, leads to a Bachelor of Science degree, which is a qualifying degree.
- a two year advanced curriculum in chemistry or in non chemical subjects. The second main cycle leads to a Master of Science degree.
- a subsequent three year PhD program for graduates who go to pursue a research oriented career.

The second main cycle can also lead directly to a doctorate degree. Some universities in Germany will offer this program for excellent students.

A conference “Chemistry Studies in the European Higher Education Area” in June 2004, initiated by the German Federal Ministry of Education and Research and organized by the GDCh, will focus the discussion on the development and implementation of future study programs in chemistry, leading to Bachelor and Master degrees which will be recognized throughout Europe. Through its membership in ECTN, GDCh is actively involved in all relevant discussions dealing with the Bologna Process.

The external quality assurance of the tiered degree programs demands a technically competent and meticulous accreditation. At an early stage, the GDCh set up a professional accreditation agency for degree programs in chemistry, biochemistry and chemical engineering at universities and universities of applied sciences (A-CBC), in collaboration with

other professional associations. In order to expand the scope of the accreditation agency to include other natural sciences, the A-CBC 2002 merged with the accreditation agency for engineering science and computer science (ASII) to form a new body known as the accreditation agency for engineering science, computer science, natural science and mathematics (ASIIN). Both the German Chemical Society (GDCh) and the German Chemical Industry Association (VCI) are members of ASIIN and support and promote the accreditation of the new degree programs. Accreditation at an individual basis does not exist in Germany for chemists. Hence, schemes such as the EurChem designation have had hardly any impact in Germany.

(2) Supply and Demand of Qualified Chemists

The annual GDCh survey of recent graduates and their first steps in a professional career provides broad information on the chemists' situation in Germany. The annual output of Diplom-Chemiker graduates is sharply decreasing:

<u>Year</u>	<u>Dipl.-Chem. graduates</u>
1995	3,070
1996	2,900
1997	2,470
1998	1,960
1999	1,480
2000	1,249
2001	1,019
2002	1,019

The annual output of PhD graduates will show a sharp decrease from its traditional level of between 2000 and 2200 to probably below 1000 in the next few years and will follow the decrease of Diplom-Chemiker graduates. In 2003 we estimate that somewhat less than 1400 new Chemistry PhDs will leave the German universities. The situation in Germany will therefore be characterized by a weak supply, which will not be sufficient to satisfy the needs of research institutions and the industry. Already now we see significant problems in academic research groups due to the increasing lack of doctoral students. But interest in chemistry is increasing. In the last years we saw the number of beginners in chemistry trending upwards as the following graph demonstrates. After a peak of 7010 beginners in 1984 a rapid decline set in (the increase in 89 and 90 is partly due to the German

reunification) which reached a minimum of 2871 beginners in 1995, 41% of the 1984 number. Starting from 2000 the numbers increased steeply with rates of some 15-20% per year. Our analysis shows that in 2003 some 6400 new students enrolled in chemistry, which is back to 91% of the 1984 all time high.

Beginners (Dipl.-Chem. and BSc)

