EFCE WORKING PARTY "EDUCATION"

SUMMARY REPORT OF OUTCOMES OF CHEMICAL ENGINEERING CORE CURRICULUM SURVEY PERFORMED IN EUROPE DURING 1994:

This summary has been compiled by J.E.Gillett from the report made by Jean Tracez to the Scientific Committee of the EFCE in 1994 and Updated 29/03/2000

The work of the Working Party Education is reported, focusing on the definition of a "Core Curriculum" commissioned by the EFCE Scientific Committee.

This "Core Curriculum" would represent about 50% of courses and could progressively become a common objective to all chemical engineering programmes in Europe.

A genuine attempt has been made to go beyond the different profiles, teaching methods, and historical development of the chemical engineering schools surveyed in the many countries in Europe.

It is important to note that:

1. The Working Party "Education" believes that a reasonable degree of diversity in chemical education is desirable. *(To take advantage of this diversity, student and educational staff exchanges between countries and cultures should be encouraged.)* Also that industry is accustomed to such variety and knows how best to make use of it, but needs objective, coherent and regularly updated information on the extremely wide range of curricula.

2. In a rapidly expanding European Union, it is essential to avoid a situation in which the title "Chemical Engineer" could correspond to truly different types of education and competence in different institutions. It is necessary to establish firstly, the level of theoretical knowledge of engineers (Compared to the training of technicians), and secondly to clarify the specific domains of knowledge.

3. This core curriculum should not be imposed (by what authority?) on existing programmes, but should be the outcome of a consensus and act as a guideline for countries seeking to develop their training programmes.

4. The present work is confined to higher education engineering studies. (i.e. those whose diplomas give access to the preparation of a Doctorate)

5. Because of the diversity of the curricula surveyed, this paper does not attempt to quote accurate objective figures on the scope of the courses according to their content. Consequently the quotations of courses are indicative only.

6. It is important that sufficient practical experience, both in the laboratory, pilot plant and industry should be included in the core curriculum

7. CHEMICAL ENGINEERING CURRICULUM:

The curriculum has been divided into three major parts:

- **Basic Science**
- **Engineering Core**
- **Electives**

The basic science part is a pre-requisite for the engineering core topics, but will also have a content of a general nature as well as topics needed for further studies. The basic science part of a chemical engineering curriculum will have more chemistry than the basic science parts of other engineering curricula.

The engineering core comprises the topics that should be common to all chemical engineers, and thereby be a major part of their professional distinction.

Electives: Both the minimum scientific base and the engineering core must be fairly broad. It is thus important that electives enable more in-depth studies in a speciality field, that should include a more thorough application of mathematics and scientific principles to engineering problems.

The division of topics within the basic science and engineering core that follows is typical but nevertheless somewhat arbitrary, and implies no suggestion or requirement on how each institution should organise their courses.

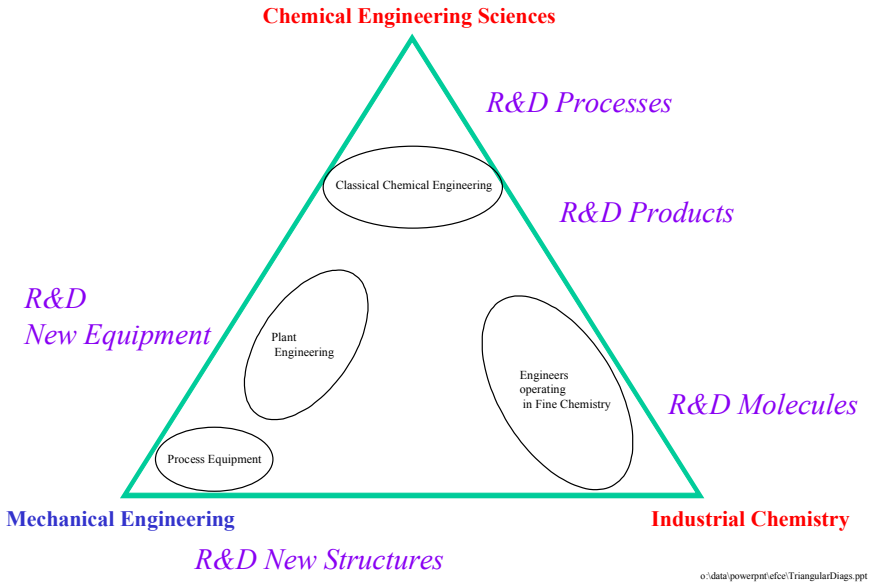
Basic Science Curriculum:
Mathematics: (approx.100 - 125% of one semester)
Computer usage (approx. 20 - 25% of one semester)
Physics (approx. 25 - 50% of one semester)
Chemistry (approx.100 - 150% of one semester)

Engineering Core Curriculum:
Thermodynamics/Physical chemistry (approx.50 - 100% of one semester)
Fluid Mechanics/Transport Phenomena (approx. 25 - 40% of one semester)
Unit Operations (approx. 40 - 50% of one semester)
Chemical Reaction Engineering (approx. 20 - 25% of one semester)
Plant Design *(Including SHE, Economics, Law, etc.)* (approx. 50 - 75% of one semester)
Equipment/Materials (approx. 20 – 30 of one semester)
Process Dynamics and Control (approx. 20 - 25% of one semester)
Chemical Engineering Laboratory (approx. 25 - 50% of one semester)
Safety & Environment (approx. 10 – 25 of one semester)

Note 1: *There is more supporting information to describe the contents covered in the topics listed above. The time-span required to deliver the above elements would be 5 - 6 semesters.*

Note 2: *The triangular diagrams used to plot curricula in the three dimensions of "Chemical Engineering Sciences", Industrial Chemistry, and Mechanical Engineering are attached.*

Chemical Engineering Areas of Application:



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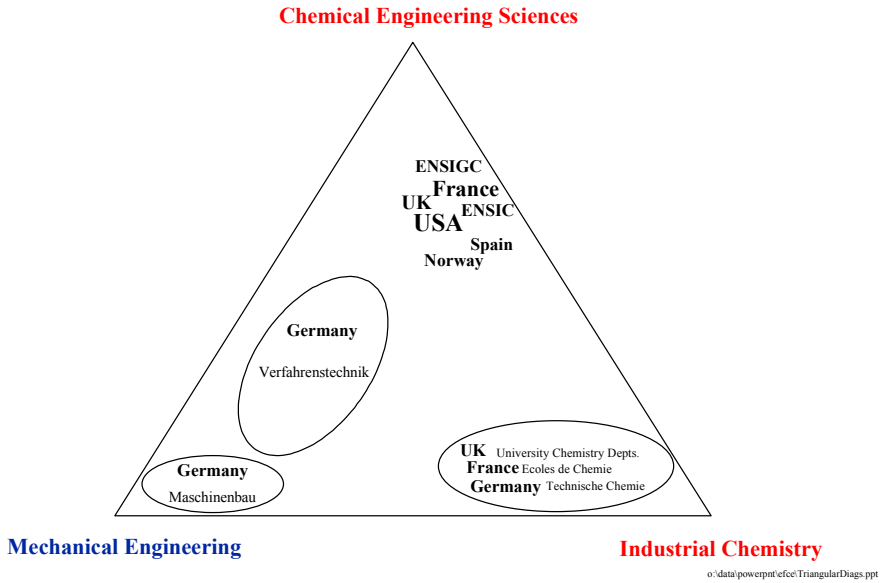
Different Chemical Engineering First Degree Curricula:



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