

## 20 Weeks of Training

### for bachelor of engineering students in Chemical and Bio Engineering

The Technical University of Denmark educates bachelors of engineering in chemical and bio engineering. A large part of our graduates end up working in process development and construction, product design, plant operations and sales. Since working with practical problems is of utmost importance for all of them we have included in the curriculum a 20 week training period where the students will try to solve engineering problems as they occur in industrial and related organizations.

The students have been prepared for this training period by the following courses, which run over two years:

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|------------------------|----------------------------------------------------------------------------------------------------------------------|
| - Physics              | fluid mechanics, mechanics, electricity and magnetism                                                                |
| - Mathematics          | including statistical methods and data processing                                                                    |
| - Chemistry            | organic, inorganic and physical chemistry                                                                            |
| - Chemical Engineering | elementary principles of chemical processes, unit operations, material of construction and environmental engineering |
| - Bioengineering       | fundamental biochemistry and microbiology and biotechnology and process design                                       |

As a preparation to the training period, the students also attend a course in industrial organization, industrial hygiene, and environment protection and control.

During the training period the students will solve some engineering problems as defined by the host company. At the end they will write a report stating findings and conclusions. The problem solving will usually involve both laboratory work and process calculations. A list of problems given to our students over the last couple of years is given below – for your inspiration.

The host organisation is assumed to provide some guidance for the students during the training period in order to allow them to learn about the social and environmental conditions under which the organisation operates.

We expect that the students will learn about some of the following items during the training period:

- Techniques of chemical analysis and the development of new analytical methods
- development of chemical processes and products
- control of processes and waste disposal
- labour relations

**Examples of problems** (for the most recent years, please see the home page of industrial practice)

- Sources of pollution in a large dairy
- Components influencing the melting point of ashes from black liquor incineration
- Selection of construction materials for various plants handling chloride containing liquids
- Development of new catalyst for hydro cracking in a refinery
- Flow in a catalytic de-sulphurizing reactor
- Optimizing a falling film condenser
- New method for analyzing sulphur containing products in oil
- Development of new ceramic materials for fuel cells
- Simulation of the flows in a chemical reactor
- Precipitation/crystallization of  $Al_2O_3$  and similar oxides and hydroxides
- Analysis of tracer components in crude oils (“finger prints”)
- Improving the method of analyzing sugar in Molasse
- Quality control in a brewery
- Study of the hydroxylase activity in penicillium chrysogenum
- Development of a peroxy dase finger printing systems
- New formulations of water based paints and flues
- Investigation of adhesive defects of band-aid
- Thermodynamic modeling of refrigerants
- User interface to a flash software package

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### **For more information see the home page for industrial practice:**

[www.kt.dtu.dk/uddannelse/diplom\\_kemi\\_praktik](http://www.kt.dtu.dk/uddannelse/diplom_kemi_praktik)