

## DESIGN PROJECT IN CHEMICAL ENGINEERING

*Practical design project through master student group work  
and problem based learning with innovations*



### OBJECTIVES OF THE COURSE

The objective of the course Design Project in Chemical Engineering is to give an overview on preliminary plant design. The course introduces acquiring of source information for design, practical methods of design with new innovations, costs and profitability estimation and presenting results of the design work.

The course is performed in groups (5-6 students) and the group prepares 5 reports. Each student acts as a project manager in turn. The topics of the design project are practical obtained from industry or research institutes. They are real projects, which are generally implemented by the company by their own recourses. The course is mainly consists of lectures, project meetings, guidance meetings, student group meetings and final seminar. Assessment of the course depends on quality of work, innovation in design, shape of reports, group works, performance in meetings, students' feedback, seminars and presentation skills.

The course requires knowledge on various topics; e.g. equipment design, reactor technology, process chemistry, mass and energy balances, process simulation, process control, process safety, costs and profitability estimation, business aspects etc. These topics are not taught in this course but are considered as the background knowledge of participating students. Therefore the course is recommended for senior students.

**Learning outcomes:**

After completing the course, students

- Acquire advanced practical knowledge on process design and preliminary plant design with innovations
- Can define market study of raw materials, products, material margin and process alternatives
- Can calculate material and energy balance and simulation of the process
- Can draw PFD, PI-diagrams, lay-out and analyses the process safety
- Can define utilities, emissions, wastes and safety aspects of the plant
- Can size the equipment and define equipment list, specification and instructions
- Can calculate capital investment, operating cost, production cost, analyses profitability
- Can create a business model and financial planning for it
- Can demonstrate team work, presentation, management and leadership skills in practical plant design

