



CHEMICAL REACTORS ENGINEERING

4 ECTS

AGH University of Science and Technology

Course responsible: prof. dr Bronisław Buczek

Course overview

The aim of the course is to develop and demonstrate knowledge and understanding of the theory of chemical reactors engineering and enhanced skills in formulation and analysis of mathematical ideal models of reactors. The classes aim is to enhance calculation of chemical reaction kinetics and homogeneous reactors. The course is built of of 20 h lectures and 25 hours classes.

The course includes: Mass balance of reactor. Stoichiometry of elementary and complex reactions. Thermal effects of reaction. Chemical reaction equilibrium. Reaction kinetics. Elements of calculation isothermal reactors and reactors with thermal effects. Distribution of residence time in the reactors. Reactors of liquid-liquid system. Heterogeneous catalysis. Kinetic analysis of contact processes. Pseudohomogeneous and heterogeneous models. Industrial reactors. Flow reactors with mixer and tubular reactors. Fixed, moving and fluidized-bed reactors.

Classes include: Calculation of current composition of reaction mixture. Determining kinetic equations from experimental data. Design of batch chemical reactors, isothermal continuous stirred tank reactors and isothermal cascades.

Outcome of the course

After you have worked through this course, including lectures and classes, you should be able to:

- Understand fundamentals of chemical reactions (Stoichiometry of single and complex chemical reactions. Thermal effects of reaction. Chemical reaction equilibrium. Reaction kinetics.)
- Understand fundamentals of ideal reactors models and industrial reactors engineering.
- Prediction and calculation of chemical reaction kinetics.
- Calculation homogeneous reactors: flow reactor with stirrer, reactor with piston flow (tubular reactor) and periodically working reactor (batch reactor).

Course coordinator & teachers

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