Course title:	**Kinetics of Heterogeneous Processes**
Institute/Division:	**FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY** / Department of Chemical and Process Engineering
Erasmus subject code:	WITCh ICHIP oIIS C10
Number of contact hours:	45 hours (30h lectures + 15h project)
Course duration:	1 semester (fall)
ETCS credits:	**4**
Course description:	**Lectures content:** A characteristics of heterogeneous chemical processes and their technological signification. / Kinetic analysis of a process within a single catalyst pellet. The term of the stage controlling the complex process rate. / Mathematical modelling of contact process in catalytic pellets of regular shapes. / Numerical methods of steady state determination of a catalytic pellet. Distributions of state variables in catalytic pellets. Issue of steady-state multiplicity of the pellet. / The overall process rate and the effectiveness factor for a contact pellet. Characteristics of contact processes occurring in the range of the external diffusion. Favourable hydrodynamic and kinetic conditions. / Heterogeneous models of stationary layers of solid catalysts. One-dimensional and two-dimensional models. Pseudo-homogeneity of contact process. / Autothermal structures of heterogeneous reactors with stationary bed of catalyst. Algorithms for determination of stationary states and design of autothermal reactors. **Project content:** Project task: In an autothermal catalytic reactor with two-stage heat exchanger an exothermic chemical reaction occurs according to the kinetic equation . The project consist of: scheme of the reactor, description of solution algorithm of boundary problem which constitutes model of autothermal reactor, description of calculation process, final results of calculations in tabular form, graphical presentation of state variables distribution in the reactor and in the heat exchanger, references.
Literature:	[1] H.S.Fogler — Elements of chemical reaction engineering, Massachusetts, 1992, Prentice-Hall ; [2] H.S.Lee — Heterogeneous reactors desing, Butterworth, 1984, Wiley; [3] D.Kunii, O.Levenspiel — Fluidization enginering, New York, 1969, Wiley; [4] G.Astarita, D.W.Savage, A.Bisio — Gas treating with chemical solvents, Newy York, 1983, Wiley
Assessment method:	Project and final exam
Prerequisites:	Courses: Mathematics, Numerical methods, Physical chemistry, Chemical engineering, Chemical reactors engineering. Skills: Computer literacy; programming in selected high-level language e.g.: Fortran, basic knowledge of Matlab
Primary target group:	Chemical Engineering Course for MSc (1st year of II cycle of study, after completing Bachelor in Chemical Engineering)
Lecturer:	dr inż. Szymon Skoneczny
Contact person:	dr inż. Szymon Skoneczny, e-mail: skoneczny@chemia.pk.edu.pl
Deadline for application:	30th August
Remarks:	The course runs regularly