Title	Code
Applied Rheology	**1010701141010720088**
Field: **Chemical and Process Engineering**	Year / Semester: **2 / 4**
Specialty: **-**	Course: **core**
Hours: Lectures: **2** Classes: **-** Laboratory: **2** Projects / seminars: **-**	Number of credits: **4**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

fundamental

Assumptions and objectives of the course:

The student should to get a knowledge concerned with real fluids important in contemporary industrial equipment. The special attention is given to show the modern physical fundamentals of the flow mechanisms in many chemical and biochemical engineering operations as well as to drag reduction praxis.

Contents of the course (course description):

Fundamentals of rheology (elasticity, viscous and viscous-elastic properties, time as a rheological parameter). Division of the fluids, macro- and microrheology. Rheological studies directions. Rheometry and the methods of rheological properties determination. Rheological state equations. Time-independent fluids (simple shear flow, genesis of the generalized Newtonian fluids rheological properties, shear-thinning and shear thickening phenomenon, plastic viscosity). The remember effects of the fluids. Linear visco-elasticity (mechanic models, relaxation Maxwell experiment, crawing phenomenon). Tixotrophy, fundamentals and modern applications. Flow velocity distributions, characteristic kinematic quantities of a flow, momentum and kinematic energy correction coefficients as well as flow activation energy as the functions of rheological parameters of the both rheometric and technical flow curves. Flow criterions for time-independent fluids. Polymeric fluids (rheological properties of the melt polymers and polymeric solutions, determination of the polymerization degree using a method of apparent viscosity, longitudinal viscosity of polymer solutions and solutions of polymeric surface active agents in a flow). Toms fluids (properties, Weisenberg and Barus effects as the indirect methods of identification, the shear flows in channels and orifices, mechanical, thermal and biological degradation. Magneto- and electromagneto- fluids (characteristics and application). The rheology of the suspensions (intermolecular effects, rheological properties, dispersion). Biological fluids (biopolymers, physiological fluids, biopolymeric gels).

Introductory courses and the required pre-knowledge:

Physics, materials science, physical chemistry.

Courses form and teaching methods:

lectures + laboratory praxis

Form and terms of complete the course - requirements and assessment methods:

Permanent control during the courses, final examination after semester 4 (written-oral).

Basic Bibliography:

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Additional Bibliography:

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