Title	Code
High Vacuum and Low Temperature Techniques (TWPiNT)	**1010401261010410715**
Field: **Technical Physics**	Year / Semester: **3 / 6**
Specialty: **-**	Course: **core**
Hours: Lectures: **2** Classes: **-** Laboratory: **1** Projects / seminars: **-**	Number of credits: **4**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

Core course of the study for Technical Physics, Faculty of Technical Physics.

Assumptions and objectives of the course:

Acquaintance of the students with the basis of the theories of the rarefied gases, high vacuum technique and method of the low temperatures obtaining

Contents of the course (course description):

The program of the course contains following topics:
Basis of the kinetic theory of the gases, viscosity, effusion and diffusion phenomena Thermal conduction and flows of the gas
Physical and chemical processes on the body surface: sorption, de-sorption and adsorption
Basis of the vacuum technologies
Vacuum components
Constructing materials
Principles of the designing and operating conditions of the vacuum systems.
Methods for generation and control of the vacuum
Classification and maintenance of the vacuum pumps
Basis of the vacuum metrology
Classification and principles of the operation of vacuum gauges
Mass spectrometry
Leaks detections
Basis of the cryogenics and Definitions
Low temperature obtaining methods
Properties of the matters under cryogenic conditions
Applications of the vacuum and low temperature techniques

Laboratory:

Presentation of vacuum setup for different advantages
Acquaintance with the vacuum components catalogues
Schemes of the vacuum systems

Realize the project of the vacuum system (in 2 person group), sampled brief foredesign by the students and including:
- project of the main vacuum chamber
- project of the pumping and control system
- selection of other parts of the system, like: valves, windows etc.

Presentation of the executed projects and discussion

Introductory courses and the required pre-knowledge:

Basic knowledge of physics, technology and chemistry

Courses form and teaching methods:

Lectures supported by multimedia presentation and simple experiments
Laboratory: realization of the individual project of the vacuum system

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

Laboratory: Credit of the course based on the: project and presentation quality
Lectures: oral examination focused on the scope of knowledge presented on the lectures

Basic Bibliography:

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Additional Bibliography:

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