

Title Construction of Research Instruments (Budowa aparatury)	Code 1010402221010420673
Field TECHNICAL PHYSICS	Year / Semester 1 / 2
Specialty -	Course core
Hours Lectures: 2 Classes: 1 Laboratory: - Projects / seminars: -	Number of credits 2
	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 selected problems concerning engineering design of scientific instruments illustrated by exemplary systems for laser spectroscopy, radio-frequency spectroscopy, mass spectroscopy and electromagnetic ion traps.

Contents of the course (course description):

- Fundamentals of signal theory - parameters of signal and signal processing circuits. Noise and interference in measuring apparatus. Techniques of noise and interference reduction. Advanced techniques of optical spectroscopy - selected systems (atomic absorption spectroscopy, absorption and emission laser spectroscopy, Raman laser spectroscopy, optical-microwave double resonance, time-domain laser spectroscopy). Light sources and detectors in optical spectrometers - design solutions and parameters. Optical and mechanical systems. Measurement signals processing circuits. Radiofrequency spectroscopy apparatus - review. Components and systems utilized in construction of radiofrequency spectrometers. Generation of magnetic field. Masers. Atomic standards of frequency and time. Charged particle in electromagnetic field. Mass spectroscopy and electromagnetic traps - construction, systems of control and detection.

Introductory courses and the required pre-knowledge:

- Knowledge of physics and mathematics at the Technical Physics undergraduate studies level. Basic knowledge of technical optics, laser technology, electronics, optoelectronics and mechanics.

Courses form and teaching methods:

- Lectures supported by multimedia presentations and classes.

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

- Lectures - evaluation of written work accomplished in last week of the course. Classes - evaluation of written work accomplished in last week of the course.

Basic Bibliography:

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Additional Bibliography:

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