

Level: PhD				
Course title: Thermal and mechanical methods for materials examination				
Status: elective				
ECTS: 15				
Requirements:				
Learning objectives Introducing students to the field of testing thermal, thermomechanical and mechanical properties of materials.				
Learning outcomes Upon completion of the course, students should have developed: <ul style="list-style-type: none"> - Knowledge of characteristics of particular types of materials in condensed state; - Ability to follow the scientific literature and prepare scientific reports and presentations; - Ability to perform independent measurements and experiments in order to characterize materials; - Ability to realize certain technical solutions. 				
Syllabus <i>Theoretical instruction</i> Specific heat and influence of the structure. Thermal dilatation. Heat conductivity. Point defects. Dislocations. Twinning crystals and stacking faults. Phase diagrams of metals and alloys. Material's response to stress. Differential thermal analysis. Differential scanning calorimetry. Thermogravimetry and derivation thermogravimetry. Dilatometric analysis. Determination of coefficient of thermal conductivity. Spreading of mechanical weaves in solids. Acoustical methods of materials investigation. Investigation of roughness by use of pressure. Materials testing by bending. Investigation of toughness. Static and dynamic methods for hardness testing. Dynamic mechanical analysis. Methods for testing the mechanical properties of thin films. Micro-and nano-indentation. Scratch test. <i>Practical instruction</i> Research work and preparation and presentation of the seminar paper.				
Weekly teaching load				Other:
Lectures: 4	Exercises:	Other forms of teaching:	Student research: 6	