

Study Programme: Master Academic Studies in Chemistry			
Course Unit Title: Thermal analysis			
Course Unit Code: IHN-519			
Name of Lecturer(s): Associate professor Berta Barta Holló			
Type and Level of Studies: Master of Science Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Summer			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 5			
Prerequisites: None			
Course Aims:			
<ul style="list-style-type: none"> - Obtaining basic knowledge on thermoanalytical methods. - Combined methods of thermal analysis. - Thermal methods in qualitative and quantitative analysis and in materials science. - Application of thermoanalytical instruments in practice. - Principles of selecting the experimental conditions. - The interpretation of experimental results 			
Learning Outcomes:			
After completing this course, student is able to:			
<ul style="list-style-type: none"> - understand the principles of thermoanalytical techniques; - take into account factors, which have effect on thermal measurements, - apply thermoanalytical methods, - choose the experimental conditions for the measurements, - combine different thermoanalytical techniques, - analyze and present the results of the measurements. 			
Syllabus:			
<p><i>Theory</i> The effect of temperature change on the properties of the sample. Application of different thermoanalytical techniques: thermogravimetry (TG), derivative thermogravimetry (DTG), differential thermal analysis (DTA), differential scanning calorimetry (DSC), thermomechanical and dynamic mechanical analysis (TMA and DMA), simultaneous techniques of thermal analysis and evolved gas analysis (EGA). Mechanism and kinetics of thermal decomposition.</p> <p><i>Practice</i> Thermal stability of new compounds. Synthesis in solid state. Determination of melting point, glass transition, purity, polymorphism. Determination of thermal properties and quality control of different compounds and materials (pharmaceuticals, food additives, polymers, etc.) by thermal measurements. Computation of kinetic parameters of the thermal decomposition.</p>			
Required Reading:			
<ol style="list-style-type: none"> 1. Principles and Applications of Thermal Analysis, P. Gabbott (ed.) Blackwell Publishing Ltd., 2008 2. Principles of Thermal Analysis and Calorimetry, P. J. Haines (ed.), RSC Paperbacks, 2002 3. Journal of Thermal Analysis and Calorimetry 4. Thermochemica Acta 5. Journal of Analytical and Applied Pyrolysis 			
Weekly Contact Hours:	Lectures: 2 (30)	Practical work: 2 (30)	
Teaching Methods:			
Lectures, laboratory work, desk study projects, seminar(s)			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	5	written exam	30
Practical work	15	oral exam	30
Preliminary exam(s)	20	