

Course title: Theory of Welding	Neptun code: GEMTT511-a
Course coordinator: Dr. habil. Marcell Gáspár, associate professor, PhD	
type and number of lesson: lecture 2 hours/ week	
method of accountability: colloquium	
curriculum location of the subject: spring	
pre-study conditions: -	
The task and purpose of the subject:	
Getting to know the physical-chemical processes that take place during welding.	
Course description:	
Conditions of physical-chemical processes during welding. Slag systems. Interaction of slag-metal and slag-metal-gas phases. Energy sources of welding. The thermal processes accompanying welding. Deformation and stress field of welded joints. The melting and metal transfer process of the filler material. Flow processes in the weld pool. Weld crystallization. Formation of gas and slag inclusions. Mechanism of crack formation caused by crystallization and solid phase transformation. The weldability. Processes taking place in the heat-affected zone of the welded joint. Selection of filler material, preheating temperature, methods of determining linear energy.	
Required literature:	
<ol style="list-style-type: none"> 1. ASM Handbook, 10th Edition, Volume 6.: Welding, Brazing, Soldering, p: 1-1299 2. Lippold, J.C.: Welding Metallurgy and Weldability, John Wiley & Sons, Hoboken, New Jersey, USA, 2015. p. 1-400. 3. Granjon, H.: Fundamentals of Welding Metallurgy, Abington Publishing, Cambridge, 1991. p. 1-178. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. Easterling, K.: Introduction to the Physical Metallurgy of Welding, London, Butterworths, 1983. p. 1- 104. 2. Porter, D. A, Easterling, K. E., Sherif, M. Y.: Phase Transformations in Metals and Alloys, 4th Edition, CRC Press, Taylor and Francis Group, 2022 	