

Course title: Theory and Technology of Heat Treatment	Neptun code: GEMTT522-a
Course coordinator: Dr. László Kuzsella, associate professor, Ph.D	
type and number of lesson: <u>lecture</u> /seminar/practical lesson/consultation 24 hours / semester	
method of accountability: <u>colloquium</u> /practical mark/other	
curriculum location of the subject: autumn/ <u>spring</u>	
pre-study conditions: None	
The task and purpose of the subject:	
The aim of the course is to acquaint students with the theory and technological implementation of heat treatment processes for ferrous and non-ferrous metals.	
Course description:	
The subject includes the following areas. The role of crystal lattices and crystal defects in changing the properties of steels and their alloys. Metallographic basis of property modification technologies. Volumetric heat treatments, heat treatments that improve machinability. Recrystallization annealing, patenting. Hardness and strength-increasing heat treatments: martensitic hardening, martempering, precipitation hardening and its technological solutions. Toughness-increasing heat treatments: refinement, normalization. Surface treatment, thermochemical processes: theoretical foundations of deposit training, technological implementations of cementation, technologies following cementation. Theoretical background of nitriding, structure of nitrided layer. Gas, ion (plasma) nitriding. Heat treatment of non-ferrous metals. Heat treatment of high-strength aluminums.	
Required literature:	
<ol style="list-style-type: none"> 1. ASM Handbook, Volume 4A: Steel Heat Treating Fundamentals and Processes, J. Dossett, G.E. Totten editors, ISBN: 978-1-62708-011-8, 2013. 2. George E. Totten: Steel Heat Treatment Handbook, CRC Press, ISBN-13: 978-0-8493-8455-4, 2007. 3. ASM Handbook Volume 2: Properties and Selection: Nonferrous Alloys and Special-Purpose Materials ISBN: 978-0-87170-378-1, 2014. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. W. D.Callister, Jr.: Material Science and Engineering - An Introduction, John Wiley and Sons, 7th edition, ISBN-13: 978-0-471-73696-7, New York, 2007. 2. G.E. Totten: Steel Heat Treatment, Equipment and Process Design, ISBN-13: 978-0-8493-8454-7, 2007. 	