

Course title: Modelling of Environment Friendly Technologies	Neptun code: GEGTT433-a
Course coordinator: Dr. Gyula Varga, associate professor	
type of lesson: 2 lectures weekly	
method of accountability: colloquium	
curriculum location of the subject: autumn	
pre-study conditions: -	
The task and purpose of the subject:	
The main goal of the course is to show how different technical solutions affect the state of the cutting edges, the quality of the machined surface, the load on the machine tool and the efficiency of the machining, when using different environmentally friendly technologies.	
Course description:	
Introduction to the topic of environmentally friendly technologies. Priority tasks of environmental policy. The role of cooling and lubricating fluids in cutting. Advantages and disadvantages of environmentally friendly processing compared to traditional processing. Inspection of dry and minimal lubricant applications. Thermal issues of minimum cooling-lubrication cutting. Tribological conditions of different cooling and non-cooling machining. Experience with environmentally friendly drilling procedures. Characteristics of the surface quality and near-surface layer. Examination of cutting using the finite element method. A model for testing the stress processes on the surface of the tool and the shear plane in the case of metal cutting. Machinability examinations.	
Required literature:	
<ol style="list-style-type: none"> 1. Christian N. Madu Editor: Handbook of Environmentally Conscious Manufacturing, Second Edition, Springer, 2022 2. David A. Dornfeld (Editor): Green Manufacturing, Fundamentals and Applications, Springer Science+Business Media New York 2013, p.: 291 3. Günther Seliger • Marwan K. Khraisheh, I.S. Jawahir (Editors): Advances in Sustainable Manufacturing, Springer-Verlag Berlin Heidelberg 2011 4. Armarego, A. J. A. - Brown, R. H.: The machining of metals, Prentice - Hall, Inc., 1984. 5. Shaw, M. C.: Metal Cutting Principles, Oxford Science Publications, Clarendon Press, 1984 	
Recommended literature:	
<ol style="list-style-type: none"> 1. National Academies of Sciences, Engineering, and Medicine. Environmental Engineering for the 21st Century: Addressing Grand Challenges. Washington, (2019) 2. Janick Artiola, Ian Pepper, Mark Brusseau: Environmental Monitoring and Characterization, ACADEMIC PRESS, 2004, p.: 410 3. K. Weinert, I. Inasaki, J. W. Sutherland, T. Wakabayashi: Dry Machining and Minimum Quantity Lubrication, CIRP Annals, Vol. 53, Issue 2, 2004, pp.: 511-537 4. Persson, B. N. J.: Sliding Friction, Physical Principles and Applications, Springer, 2nd edition, 2000. 5. Dudás Illés, Fridhelm Lierath, Varga Gyula: Környezetbarát technológiák a gépgyártásban, Forgácsolás szárazon, minimális hűtéssel–kenéssel, GÉPGYÁRTÁS-TECHNOLÓGIA V., Műszaki Kiadó, Budapest, 2010, p.: 309 	