

Course title: Mathematical Models of Logistics	Neptun code: GEALT420-a
Course coordinator: Dr. Tamás Bányai, PhD, dr. habil., professor	
type of lesson and number of lessons: lecture (2)	
method of evaluation: colloquium	
curriculum location of the subject: (autumn/spring semester): autumn and spring	
pre-study conditions (<i>if any</i>): -	
The task and purpose of the subject:	
During the course, students will learn about the mathematical methods applicable to the design and management of logistics systems. The aim is to master the foundational modeling techniques necessary for optimizing logistics systems.	
Course description:	
The concept of complex material handling. Basics of logistics. Description of deterministic and stochastic material flow processes. Mathematical methods of layout planning: linear and quadratic assignment, heuristic methods. Mathematical models and methods of unit load building. Optimization methods for JIT supply logistics systems. Different mathematical models and optimisation methods for logistics integrated production management. Mathematical methods for design and management of logistics systems for delayed assembly. Mathematical models for global logistics. Inventory models. Mathematical models of virtual logistics enterprise. Models for reliability analysis of logistics systems. Mathematical models of warehousing systems. Optimisation problems for recycling logistics systems.	
Required literature:	
1. Bányai, T.: Design of Material flow systems. 2021. ISBN 978-963-358-237-4	
2. Simchi-Levi D., Chen X., Bramel J.: The logic of logistics - theory, algorithms, and applications for logistics and supply chain management. Springer, 2005. ISBN 0-387-22199-9	
Recommended literature:	
1. Langford, J.W.: Logistics, principles and applications. McGraw-Hill, 2007. ISBN 978-0-07-147224-1	