1. Subject name	**Algorithm Design**				
2. Subject name in Hungarian	Algoritmusok tervezése				
3. Code	**BMEKOKAM326**	4. Evaluation type	**mid-term grade**	5. Credits	**5**
6. Weekly contact hours	**2 (10) Lecture**	**0 (0) Practice**	**2 (11) Lab**		
7. Curriculum	**Logistics Engineering MSc (L)**	8. Role	**Mandatory (mc) at Logistics Engineering MSc (L)**		
9. Working hours for fulfilling the requirements of the subject					**150**
Contact hours	56	Preparation for seminars	18	Homework	30
Reading written materials	34	Midterm preparation	12	Exam preparation	0
10. Department	**Department of Control for Transportation and Vehicle Systems**				
11. Responsible lecturer	Dr. Bécsi Tamás				
12. Lecturers	Dr. Bécsi Tamás				
13. Prerequisites					

14. Description of lectures

Algorithm design. Numerical complexity. The O notation. Efficiency, calculation, and memory requirements for algorithms. Algorithm descriptive tools: flowchart, structogram, pseudo code. Elements of structured programming, its relationship with the design of algorithms.
In addition, the methods of designing algorithms and their optimization are presented. The theoretical background of the subject is illustrated with examples from the field of logistics.
Algorithm design paradigms: algorithm reduction, divide-and-conquer, dynamic programming, "greedy" algorithm, backtracking, etc.
Designing data structures from an algorithmic point of view. Lists, tree structure, graphs. Sorting, searching algorithms. Route Choice and Traveling Salesman problems.

15. Description of practices

16. Description of labortory practices

In the course of laboratory tasks the implementation questions of the theoretical material of the lecture are presented. In addition, students implement algorithms in a development environment of their own choice.

17. Learning outcomes

A. Knowledge
- knows the concept of numerical complexity
- knows different basic algorithm design approaches
- knows basic data structures

B. Skills
- can independently evaluate the complexity of an algorithm
- can design algorithms for well-defined tasks

C. Attitudes
- is interested in modern IT solutions
- capable of algorithmic thinking that can be applied in other areas

D. Autonomy and Responsibility
- is able to consult in a team in algorithmic and programming tasks, to make independent decision

18. Requirements, way to determine a grade (obtain a signature)

Two midterm exams. The final grade is the rounded average of the exams.

19. Opportunity for repeat/retake and delayed completion

One midterm exam can be retried in the delayed completion period.

20. Learning materials

Lecture Notes

Effective date	10 October 2019	**This Subject Datasheet is valid for**	Inactive courses