1. Subject name	**Modelling and control of vehicles and traffic systems**				
2. Subject name in Hungarian	Járműforgalmi rendszerek modellezése és irányítása				
3. Code	**BMEKOKAM233**	4. Evaluation type	**exam grade**	5. Credits	**6**
6. Weekly contact hours	**2 (11) Lecture**	**3 (17) Practice**	**0 (0) Lab**		
7. Curriculum	**Transportation Engineering MSc (K)**	8. Role	**Specialization (sp) at Transportation Engineering MSc (K)**		
9. Working hours for fulfilling the requirements of the subject					**180**
Contact hours	70	Preparation for seminars	16	Homework	34
Reading written materials	23	Midterm preparation	12	Exam preparation	25
10. Department	**Department of Control for Transportation and Vehicle Systems**				
11. Responsible lecturer	Dr. Varga István				
12. Lecturers	Dr. Tettamanti Tamás, Dr. Sághi Balázs, Dr. Varga István, Dr. Hrivnák István				
13. Prerequisites					

14. Description of lectures

Air Transport:
Basic units of air traffic control. Air-ground communication ACC, APP, TMA. ACARS DATALINK. Airport transport systems. Modeling systems of civil aviation related to flow management. Civil aviation and air traffic control planning.
Road traffic:
Structure and operation of road traffic control systems. Characterization of road traffic, measurement of traffic technology parameters. Urban and highway traffic management theory: strategies, tools, software.
Road Measurement Technology: Smoothing, Filtering, Forecasting, Recursive Least Square Estimator, Kalman Filter, Moving Horizon Estimation.
Modeling and managing urban traffic: Store-and-forward model, LQ and MPC control.
Modeling and managing motorway traffic: LWR model, shock wave modeling, PID, LQ, nonlinear MPC methods.
Rail transport:
The task of railway traffic management, the levels of operation. Tools for scheduling planning and control. Positive and operative management tasks and solutions. The interlocking device as the basis for operational control. Special cases of train tracking, solutions. Train Track Control Solutions, Connection to Automatic Signaling, Disposal Criteria, Planning. Modeling of traffic management. Design of traffic control systems. Tools to support design.

15. Description of practices

A specific design task, simulation problems

16. Description of labortory practices

17. Learning outcomes

A. Knowledge
- is familiar with the structure and operation of traffic control systems
- knows the levels and methods of traffic modeling

B. Skills
- capable of modeling traffic on a given network
- is able to control a given subnet
- is able to use and design a form for measuring and estimating systems

C. Attitudes
- open to research traffic management systems

D. Autonomy and Responsibility
- can independently design traffic contro

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

Requirements: successful completion (min. 50%) of the midterm and submission of the seminar project report. The exam is the presentation of the seminar project. The final grade is calculated as the average of the mid-term and the seminar reporting activity.

19. Opportunity for repeat/retake and delayed completion

There is a retake option for the midterm and the homework can resubmitted upon request till the end of delayed completion period.

20. Learning materials

Lecture Notes

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