



1. Subject name	Communications, Navigation and Surveillance (CNS) I.
------------------------	---

2. Subject name in Hungarian	Communications, Navigation and Surveillance (CNS) I.
-------------------------------------	--

3. Code	BMEKOKAM226	4. Evaluation type	mid-term grade	5. Credits	3
----------------	--------------------	---------------------------	----------------	-------------------	----------

6. Weekly contact hours	2 (9) Lecture	1 (5) 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	90
--	-----------

Contact hours	42	Preparation for seminars	8	Homework	8
----------------------	----	---------------------------------	---	-----------------	---

Reading written materials	20	Midterm preparation	12	Exam preparation	0
----------------------------------	----	----------------------------	----	-------------------------	---

10. Department	Department of Control for Transportation and Vehicle Systems
-----------------------	---

11. Responsible lecturer	Dr. Meyer Dóra
---------------------------------	----------------

12. Lecturers	Dr. Meyer Dóra, Károly Bianka
----------------------	-------------------------------

13. Prerequisites	
--------------------------	--

14. Description of lectures

The basics of navigation. Coordinate systems, map types, calculation of navigation elements (eg direction, wind triangle, fuel consumption, flight time, flight speed), route planning. Theoretical background, structure, data traffic, operation and exercises of navigation systems.

Ground systems: non-directional beacons (NDBs) / Automatic direction finder (ADF)

GLOBAL NAVIGATION NAVIGATION SYSTEMS (GNSS)

PRIMER RADAR AIRCRAFT CONTROL. Using Primary Radars. Characteristics of primary radars. Grouping radars according to their field of application. Antennas (PSR). Transmitter equipment. Receiver equipment. Plot extractor and signal processing. Plot combination. Transmission of data. ROAD RADAR (SMR). Aerodrome use of roller radars. SMR radar sensor. SMR display systems. SECONDARY RADAR SSR and MSSR. Use secondary radars. Antenna. SSR Interrogator, Transponder. Customer. Plot extractor and signal processing. Combining Plot. THE S MODE. ADS. ADS-B techniques. S mode extended squitter. ADS-C techniques. MULTILATERATION (MLAT)

15. Description of practices

Design tasks, maintenance tests, operational tests

16. Description of laboratory practices
--

17. Learning outcomes

A. Knowledge

- is familiar with the basic concepts of air navigation
- knows ground navigation systems
- knows different satellite navigation systems

B. Skills

- is able to interpret data from aviation information systems
- be able to participate in the specification and design of air traffic information systems.

C. Attitudes

- is interested in modern IT solutions

D. Autonomy and Responsibility

- is able to independently further propagate in various special fields of the learned field

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

Two midterm exams, both must be sufficient, plus performing the individual task, final semester mark is the rounded up average of the midterm exams.

19. Opportunity for repeat/retake and delayed completion

The midterm exams can be retried at the end of the semester. The individual task cannot be delayed completed.

20. Learning materials

Lecture Notes

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