Intelligent Transport Systems - BMEEOFTMF61

I. Subject Specification

1. Basic Data

1.1 Title

Intelligent Transport Systems

1.2 Code

BMEEOFTMF61

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	1
Seminar	1

1.5 Evaluation

Midterm grade

1.6 Credits

3

1.7 Coordinator

name	Dr. Tamas Lovas
academic rank	Associate professor
email	lovas.tamas@emk.bme.hu

1.8 Department

Department of Photogrammetry and Geoinformatics

1.9 Website

https://epito.bme.hu/BMEEOFTMF61
https://fiek2.mywire.org/course/view.php?id=3533

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Recommended elective in the Specialization in Highway and Railway Engineering (MSc) programme

Recommended elective in the Land Surveying and Geoinformatics (MSc) programme

1.12 Prerequisites

1.13 Effective date

1 February 2022

2. Objectives and learning outcomes

2.1 Objectives

The main objective of the course is to provide students with an in-depth knowledge of the civil engineering discipline of Intelligent Transport Systems. They will learn about the international regulatory framework, data, data acquisition and data storage technologies used in ITS. The lectures will introduce the range of data collected on infrastructure and vehicles, vehicle navigation methods, self-driving car technologies. In the exercises, they will work on project tasks, gaining insights into the challenges and methods of data mining and processing. During the semester, students will gain first-hand experience of the industrial application of intelligent transport systems through guest lectures and/or visits to industrial partners.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. is familiar with the main international regulations on Intelligent Transport Systems (ITS).
2. has an overview of ITS application areas.
3. has an overview of the data mining technologies used in ITS.
4. knows some ITS mapping standards.
5. knows the principles of operation of on-board sensor systems.
6. has a contextual understanding of the application of geographic information technology in ITS.
7. knows the basic technical characteristics of the communication technologies used in ITS

B. Skills

1. is able to select the appropriate data collection technology for different tasks used in ITS.
2. performs primary data processing of sensor data.
3. stores location data in spatial information structures.
4. displays the processed data and results on maps.
5. sescribes the main topics of the subject in a concise manner, using the correct terminology orally and in writing.

C. Attitudes

1. collaborates with the teacher and fellow students to expand knowledge.
2. tries to contribute proportionately when working in a team.
3. strives to produce accurate mapping outputs.

4. participates in project consultations, arriving on time to take part in collaborative work.

D. Autonomy and Responsibility

1. independently performs the tasks and parts of tasks assigned to him/her in the project assignment.
2. in the case of criticism of his/her work by teachers and students, he/she accepts well-founded critical comments and incorporates them into his/her further work.
3. he/she cooperates with fellow students in solving common parts of project tasks (e.g. data collection).
4. actively participates in peer discussion during the presentation of project tasks.
5. expresses his/her opinion with reasons.

2.3 Methods

Lectures and project-based, consultative exercises. Performance assessment through final papers and homework assignments.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	ITS objectives, economic role, EU directives, projects, basic concepts
2.	Map, map content, infrastructure data and perception, position
3.	Vehicle data and sensing; vehicle sensors
4.	Communication
5.	Vehicle and pedestrian navigation, geospatial analysis of traffic data
6.	Data processing: graph analysis, traffic data processing, geospatial analysis of traffic data
7.	Partial summary
8.	application of Intelligent Transport Systems (ITS) in Hungary
9.	ITS applications in pedestrian movement detection and support
10.	ITS trends in Europe
11.	Road ITS applications I.
12.	Road ITS applications II.
13.	practical project task presentation, discussion I.
14.	practical project task presentation, discussion II.

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

Supporting study materials are available at https://edu.epito.bme.hu

2.6 Other information

The subject may include a group visit to an industrial partner.

2.7 Consultation

as indicated on the department's website or by prior arrangement by e-mail; e-mail: lovas.tamas@emk.bme.hu

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

The assessment of the learning outcomes set out in 2.2 is based on a test, a home assignment, and active participation in exercises and consultations.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
test	T	A.1-A.7; B.5
home assignment	HA	A.1-A.7; B.1-B.5; C.3; D.1-D.2
activity	A	C.1-C.2, C.4; D.1-D.5

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

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3.3 Evaluation system

Abbreviation	Score
T	50%
HA	40%
A	10%
Sum	100%

The test will be unsuccessful if it does not reach 50% of the available marks.

3.4 Requirements and validity of signature

No signature is obtained in the subject.

3.5 Grading system

Grade	Points (P)
excellent (5)	90<=P
good (4)	80<=P<90%
satisfactory (3)	65<=P<80%
passed (2)	50<=P<65%
failed (1)	P<50%

3.6 Retake and repeat

1) The test can be retaken during the make-up week.

2) The assignment may be submitted late, subject to the payment of a fee as specified in the regulations, until 16:00 on the last day of the make-up period or sent electronically until 23:59.

3) Home assignment submitted and accepted may be corrected free of charge up to the deadline and in the manner specified in 2)).

4) Due to the nature of active participation, it cannot be replaced, corrected or otherwise substituted or replaced.

3.7 Estimated workload

Activity	**Hours/semester**
participation in contact lessons	14×2=28
mid-semester preparation for exercises	14×1=14
preparation for performance assessment	10
home assignment preparation	38
Sum	90

3.8 Effective date

1 February 2022

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Inactive courses