Construction Information Technology Engineering Project - BMEEODHMB5P

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

Construction Information Technology Engineering Project

1.2 Azonosító (tantárgykód)

BMEEODHMB5P

1.3 Tantárgy jellege

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Konzultáció	2

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Félévközi érdemjegy

1.6 Kreditszám

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1.7 Tárgyfelelős

név	Dr. Laszlo Dunai
beosztás	Egyetemi tanár
email	dunai.laszlo@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Dékáni hivatal

1.9 A tantárgy weblapja

https://epito.bme.hu/BMEEODHMB5P
https://edu.epito.bme.hu/course/view.php?id=3564

1.10 Az oktatás nyelve

angol

1.11 Tantárgy típusa

Kötelező az Építményinformatikai mérnök (MSc) szakon

1.12 Előkövetelmények

1.13 Tantárgyleírás érvényessége

2022. szeptember 1.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The aim is to develop the competences needed for complex construction projects. Students will learn how IT technologies support engineering processes. They will learn the basics of building IoT networks, basic hardware components, development techniques for control, and basic requirements for smart homes. Students will get insights into practical applications of sensor networks monitoring the energy-efficiency, safety, and comfort of buildings. Students will understand how smart monitoring systems support building energy performance analysis, and sustainability goals. They will learn the basics of point cloud processing in their own development environment. Students will gain knowledge of BIM-based building surveying. The course will provide a solid basis for the complex project assignment that will follow, where students will build an IoT network and collect data in a real environment.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése utána a hallgató

A. Tudás

1. Knows the architecture of microcontroller-based IoT devices.
2. Knows the components of smart homes.
3. has an overview of the data types and formats that can be acquired through IoT networks.
4. knows the info-communication background of IoT devices and smart homes.
5. understands the benefits regarding sustainability goals of smart home systems and facility management.
6. understands the principles of monitoring various environmental characteristics using sensor networks.
7. understands how point clouds can support particular engineering applications.
8. knows basic point cloud processing workflows.
9. has an overview of building survey technologies.
10. knows how to build a basic BIM model.

B. Képesség

1. creates a basic IoT system.
2. able to set the parameters of an IoT device.
3. applies the methods of numerical methods in the control and data acquisition of sensor networks.
4. able to acquire data for building energy performance or comfort analysis.
5. able to carry out basic point cloud processing workflows.
6. derives data from point clouds that enables engineering analysis.
7. performs indoor building surveys.
8. able to create a simple BIM model that is able to support smart home applications.

C. Attitűd

1. collaborates with the teacher and fellow students in gaining knowledge,
2. is continuously gaining knowledge,
3. looks for the latest, most suitable technological solutions in order to implement the design in a high-quality,
4. is open to the use of IT tools and equipment,
5. makes effort to understand and use the tools in use,
6. aims accuracy in his/her calculations/solutions,
7. aims understanding the criticism,
8. applies self-checking of his/her calculations, corrects the mistakes,
9. has a need for the use of optimal, durable and safe technologies,
10. strives to take into account the principles of energy efficiency and environmental awareness and to expand his knowledge of such subjects.

D. Önállóság és felelősség

1. is independent in problem statements and solutions based on given resources,
2. in some situations - e.g. in team-based home assignments - collaborates with fellow students in solving tasks,
3. aims to understand the complexity, and comprehensiveness of the problems and recognize the synergies,
4. in the case of teacher and fellow student criticism of his work, he accepts the well-founded critical comments and incorporates them into his further tasks,
5. actively participates in the professional debate, and expresses his opinion with justification.

2.3 Oktatási módszertan

Under continuous supervision individually solves homework, communication in oral and written form, and uses IT tools and equipment.

2.4 Részletes tárgyprogram

Week	**Topics of lectures and/or exercise classes**
1.	demonstration - microcontroller-based sensors
2.	demonstration - microcontroller-based sensors
3.	development environment of IoT devices
4.	development environment of IoT devices
5.	practical applications of sensor networks in buildings
6.	building microcontroller-based IoT device
7.	building microcontroller-based IoT device
8.	building microcontroller-based IoT device
9.	building microcontroller-based IoT device

10.	point cloud processing
11.	point cloud processing
12.	building survey
13.	building survey
14.	assessment

A félév közbeni munkaszüneti napok miatt a program csak tájékoztató jellegű, a pontos időpontokat a tárgy honlapján elérhető "Részletes féléves ütemterv" tartalmazza.

2.5 Tanulástámogató anyagok

a) Textbooks, literature:

- project-specific, consult with the supervisor

b) Online materials: materials uploaded to the web site of the subject, e.g.:

- general presentation slides
- guidelines

2.6 Egyéb tudnivalók

2.7 Konzultációs lehetőségek

The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail.

Jelen TAD az alábbi félévre érvényes:

Inactive courses

II. Tárgykövetelmények

3. A tanulmányi teljesítmény ellenőrzése és értékelése

3.1 Általános szabályok

The assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance will be carried out through home assignments and active consultation work.

3.2 Teljesítményértékelési módszerek

Evaluation form	Abbreviation	Assessed learning outcomes
Home assignment	HA1	A.1-6., B.1-4., C.1-7., D.1-2.
Home assignment	HA2	A.7-8., B.5-6., C.1-7., D.1-2.
Home assignment	HA3	A.9-10., B.7-8., C.1-7., D.1-2.
activity	A	A.1-10., B.1-8., C.1-7., D.1-2.

A szorgalmi időszakban tartott értékelések pontos idejét, a házi feladatok ki- és beadási határidejét a "Részletes féléves ütemterv" tartalmazza, mely elérhető a tárgy honlapján.

3.3 Teljesítményértékelések részaránya a minősítésben

Abbreviation	Score
HA1	60%
HA2	20%
HA3	10%
A	10%
Sum	**100%**

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

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3.5 Érdemjegy megállapítása

Grade	Points (P)
excellent (5)	80<=P
good (4)	70<=P<85%
satisfactory (3)	60<=P<70%
passed (2)	50<=P<60%
failed (1)	P<50%

3.6 Javítás és pótlás

1. Each home assignment can be resubmitted one week after the normal deadline, free of charge.
2. “Activity” A cannot be repeated, cannot be substituted with other forms of activity.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	**Hours/semester**
consultation hours	14x2=28
preparing HA1	110
preparing HA2	34
preparing HA3	18
Sum	180

3.8 A tárgykövetelmények érvényessége

2022. szeptember 1.

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Inactive courses