

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

COMPLEX CONSTRUCTION IT PROJECT

1.2 Azonosító (tantárgykód)

BMEEODHMB5K

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. Árpád Barsi
beosztás	Egyetemi tanár
email	bari.arpad@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Dékáni hivatal

1.9 A tantárgy weblapja

<https://epito.bme.hu/BMEEODHMB5K>

<https://edu.epito.bme.hu/course/view.php?id=3570>

1.10 Az oktatás nyelve

angol

1.11 Tantárgy típusa

Kötelező az Építményinformatikai mérnök (MSc) szakon

1.12 Előkövetelmények

1.13 Tantárgyleírás érvényessége

2025. január 31.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The course focuses on equipping students with the skills required for managing complex construction projects. They will explore how IT technologies enhance engineering processes and gain foundational knowledge in building IoT networks, hardware components, control development techniques, and smart home requirements. Practical applications of sensor networks will be covered, emphasizing energy efficiency, safety, and comfort in buildings. Students will learn how smart monitoring systems contribute to energy performance analysis and sustainability goals. They will also acquire basic skills in point cloud processing within their own development environment and gain insights into BIM-based building surveying. The course lays the groundwork for a comprehensive project assignment, where students will design an IoT network and collect real-world data.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése után 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 numerical methods to 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 can 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 to implement the design in a high quality,
4. Is open to the use of IT tools and equipment,
5. Makes an effort to understand and use the tools in use,
6. Aims accuracy in his/her calculations/solutions,
7. Aims to understand the criticism,
8. Applies self-checking of his/her calculations, corrects the mistakes,
9. Needs the use of optimal, durable, and safe technologies,
10. Strives to take into account the principles of energy efficiency and environmental awareness and to
11. 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, communicates 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 Grasshopper
2.	demonstration Grasshopper
3.	demonstration Ladybug
4.	demonstration Ladybug
5.	building survey by laser scanning
6.	building survey by Orthograph
7.	building IoT network
8.	building IoT network
9.	building IoT network
10.	building IoT network
11.	building energy modeling
12.	building energy modeling
13.	project documentation
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 website of the subject, e.g.:

- general presentation slides
- guidelines

2.6 Egyéb tudnivalók

2.7 Konzultációs lehetőségek

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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:

II. Tárgykövetelmények

3. A tanulmányi teljesítmény ellenőrzése és értékelése

3.1 Általános szabályok

The assessment of the learning outcomes is 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.1-11., D.1-5.

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

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	30%
HA2	30%
HA3	30%
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)	$80 \leq P$
good (4)	$70 \leq P < 80$
satisfactory (3)	$60 \leq P < 70$
passed (2)	$50 \leq P < 60$
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, and cannot be substituted with other forms of activity.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/semester
Consultation hours	$14 \times 2 = 28$

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Preparing HA1	52
Preparing HA2	50
Preparing HA3	50
Sum	180

3.8 A tárgykövetelmények érvényessége

2025. január 31.

Jelen TAD az alábbi félévre érvényes: