

I. Tantárgyleírás**1. Alapadatok***1.1 Tantárgy neve***COMPLEX CONSTRUCTION IT PROJECT WORK***1.2 Azonosító (tantárgykód)***BMEEOFTMSFCI03-00***1.3 Tantárgy jellege*

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Laboratóriumi gyakorlat	2

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Félévközi érdemjegy

1.6 Kreditszám

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1.7 Tárgyfelelős

név	Dr. Lovas Tamás
beosztás	Egyetemi docens
email	lovas.tamas@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Fotogrammetria és Térinformatika Tanszék

1.9 A tantárgy weblapjaepito.bme.hu<https://edu.epito.bme.hu/course/view.php?id=5151>*1.10 Az oktatás nyelve*

magyar

1.11 Tantárgy típusa

Kötelező az Építményinformatikai mérnök (MSc) szakon

*1.12 Előkövetelmények**1.13 Tantárgyleírás érvényessége*

2025. szeptember 1.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

This course builds upon the foundations laid in the "Construction Information Technology Engineering Project" by expanding into advanced digital design, building data acquisition, and energy analysis workflows. Students begin with visual programming demonstrations using Grasshopper and Ladybug, exploring parametric design and environmental data analysis tools. The focus then shifts to building surveying techniques through laser scanning and mobile-based applications. In the central phase of the course, students work on developing IoT networks tailored to building environments, integrating previously acquired microcontroller knowledge. The final weeks are dedicated to creating building energy models and compiling comprehensive project documentation. The course concludes with an assessment that evaluates both technical skills and project outcomes.

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 information 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

Students are introduced to the tools used in their first university classes, then receive project assignments and consult with tutors on a weekly basis, working at home and on campus.

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

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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:

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

Assessment Name (Type)	Code	Assessed Learning Outcomes
Home assignment 1	HA1	A.1-6., B.1-4., C.1-7., D.1-2.
Home assignment 2	HA2	A.7-8., B.5-6., C.1-7., D.1-2.
Home assignment 3	HA3	A.9-10., B.7-8., C.1-7., D.1-2.
Activity	A	C.1-11., D.1-5.

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

Code	Weight
HA1	30%
HA2	30%
HA3	25%
A	15%
Total	100%

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

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3.5 Érdemjegy megállapítása

Grade	Score (P)
excellent (5)	$80 \leq P$
good (4)	$70 \leq P < 80\%$
satisfactory (3)	$60 \leq P < 70\%$
pass (2)	$50 \leq P < 60\%$
fail (1)	$P < 50\%$

3.6 Javítás és pótlás

Each home assignment can be resubmitted one week after the normal deadline, free of charge. 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
Laboratory	$14 \times 2 = 28$
Consultation hours	$14 \times 1 = 14$
Preparing HA1	48
Preparing HA2	48
Preparing HA3	42

3.8 A tárgykövetelmények érvényessége

2025. szeptember 1.

Jelen TAD az alábbi félévre érvényes: