

I. Tantárgyleírás**1. Alapadatok***1.1 Tantárgy neve***SURVEYING I.***1.2 Azonosító (tantárgykód)***BMEEOAFBSFC001-00***1.3 Tantárgy jellege*

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Előadás (elmélet)	1
Laboratóriumi gyakorlat	2

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Vizsga

1.6 Kreditszám

4

1.7 Tárgyfelelős

név	Dr. Rózsa Szabolcs
beosztás	Egyetemi tanár
email	rozsa.szabolcs@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Általános- és Felsőgeodézia Tanszék

1.9 A tantárgy weblapjaepito.bme.hu<https://edu.epito.bme.hu/course/view.php?id=5241>*1.10 Az oktatás nyelve*

magyar

1.11 Tantárgy típusa

Kötelező az építőmérnöki (BSc) szakon

*1.12 Előkövetelmények**1.13 Tantárgyleírás érvényessége*

2025. szeptember 1.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The aim of the course is to familiarise the student with the basic concepts of surveying, the structure of surveying instruments and to learn the basic surveying measurements and their processing. Including optical levelling (line levelling, detail levelling), the use of theodolite and total station, measurement of horizontal and vertical angles. Students will learn and practise the use of units of measurement used in surveying and the mathematical tools for determination of coordinates and height.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése után a hallgató

A. Tudás

1. He/she is familiar with the basic concepts and tasks of surveying, both as a science and a profession, 2. He/she understands the structure and types of levelling instruments, 3. He/she is familiar with the methods for height determination, 4. He/she knows how to perform line and detail levelling and how to process measurements, 5. He/she knows the systematic errors of levelling and the rules of levelling, 6. He/she knows how to perform trigonometric height measurement, its systematic errors and how to eliminate them, 7. He/she is familiar with the structure of the theodolite / total station, and the principles of the examination of the instrument, 8. He/she knows the systematic errors of angle measurement and how to deal with them, 9. He/she knows the units of measurement used in surveying, 10. He/she has a basic knowledge of the map projections and base networks used in surveying practice, 11. He/she has a knowledge of accessing surveying data, 12. He/she has a knowledge of the fundamental tasks of surveying, and the orientation of horizontal angle measurements.

B. Képesség

1. He/she has the ability to use the units of measurement used in geodesy, and convert between them. 2. He/she is able to determine height by levelling, 3. He/she is able to set up theodolite correctly and carry out horizontal and vertical angle measurements, 4. He/she is able to process horizontal and vertical angle measurements and eliminate systematic errors, 5. He/she is able to reduce field distance measurements to the reference surface, 6. He/she is able to orientate horizontal angle measurements, determine horizontal coordinates of unknown points using the fundamental tasks of surveying (1 and 2), 7. He/she can determine height using trigonometric height measurement, 8. He/she is able to determine the coordinates of an unknown point using innersection methods.

C. Attitűd

1. He/she can collaborate with the teacher and fellow students to expand knowledge, 2. He/she is endeavour to master the use of instruments necessary for surveying tasks, 3. He/she makes efforts to use the built-in programs and memory functions of pocket calculators effectively, 4. He/she makes efforts to perform tasks accurately and without error, and applies checking methods when possible.

D. Önállóság és felelősség

1. In addition to contact lessons, students will practice the use of the theodolite independently and prepare for the practical test, 2. He/she is open to well-founded critical comments, 3. He/she independently documents the measurements carried out, and takes the responsibility for the correctness of the results, 4. He/she independently evaluates the obtained results and their correctness.

2.3 Oktatási módszertan

Lectures, literature review (at home), studying the online learning materials, calculation and measurement exercises (as independent work also), written and oral communication, use of IT tools and techniques, independent tasks.

2.4 Részletes tárgyprogram

1. The principle of positioning. The definition of height, reduced levels. Principle of levelling. The structure of the surveyors' level. Surveying: science and profession. Basic Calculation techniques: units. Calculations with angles. Trigonometric functions and their determination with a calculator. Trigonometric theorems. 2. The principle of levelling. The fundamentals of levelling observations. 3. Systematic error sources of levelling. The principle of detail point levelling. Determination of vertical control points with line levelling. 4. Detail point levelling. 5. Horizontal measurements. Angular observations, the theodolite. Systematic error sources of angular observations. The calibration of the theodolite and total stations. The definition of mean directions and zenith angles. Using the theodolite: set up and aiming. 6. Using the theodolite: measuring horizontal and vertical angles

in two faces. Calculation of the mean direction and the zenith angle from circle readings. 7. Using the theodolite: measurement and processing of angular observations. Geodetic map projections. National control networks. Registry of surveying data. 8. Trigonometric heighting. Distance measurements, corrections and reductions. 9. The fundamental tasks of surveying. 10. Orientation of the horizontal circle. Determination of a polar point. 11. Calculating trigonometric heighting. The measurement of distances: corrections and reductions. Determination of detail points by tacheometry. Total stations. Phases of measurements. Supporting features of total stations. 12. Intersection, arc section, resection. 13. Introduction of total station, basic measurements. 14. Setting out with polar coordinates and offsets. Setting out with total stations; features supporting setting out with total stations. Setting out roadworks.

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) Printed lecture notes: Bannister-Raymond-Baker: Surveying (Prentice Hall) b) Online materials:

<https://edu.epito.bme.hu/course/view.php?id=342>

2.6 Egyéb tudnivalók

Participation in lectures and exercises is compulsory. Students who miss 30% or more classes will not receive credit for the course.

2.7 Konzultációs lehetőségek

As indicated on the department's website, or by prior arrangement in person or by e-mail; e-mail: foldvary.lorant@emk.bme.hu

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 defined in 2.2 is based on a practical test, two midterm tests and a written exam.

3.2 Teljesítményértékelési módszerek

Assessment Name (Type)	Code	Assessed Learning Outcomes
1st Mid-term Test	MD1	A2-5, A9; B1-2; C4; D4
Practical Test	PT	A7-8; B3-4; C2, C4; D1-4
2nd Mid-term Test	MD2	A9, A12; B6; C3-4; D4
Exam	E	A1-12; B1-8; C1-4; D4

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
MD1	20%
PT	0% (must be completed)%
MD2	20%
E	60%
Total	100%

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

The requirement for the signature: - minimum 50% achieved both at MT1 and MT2 assessments - completion of the PT assessment - attendance of at least 70% in lectures and practicals The validity of the signature is valid for 2 years from the date of obtaining it.

3.5 Érdemjegy megállapítása

Grade	Score (P)
excellent (5)	$88 \leq P$
good (4)	$76 \leq P < 88\%$
satisfactory (3)	$63 \leq P < 76\%$
pass (2)	$50 \leq P < 63\%$
fail (1)	$P < 50\%$

3.6 Javítás és pótlás

1) There is a minimum requirement for each assessment, which can be retake once. 2) In the case of two attempts of an assessment, the last result obtained by the student will be taken into account. 3) If the student is unable to obtain at least a pass mark by retaking the assessment in accordance with point 1, a second attempt to re-retake a maximum of two unsatisfactory assessments can attempted, subject to payment of a fee as specified in the regulations.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/Semester
participation in contact classes	$14 \times 3 = 42$
preparation for the classes, independent work	21
preparation for MTs	$8 + 11 + 8 = 27$
preparation for the exam	30

3.8 A tárgykövetelmények érvényessége

2025. szeptember 1.

Jelen TAD az alábbi félévre érvényes: