

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

Geodynamics

1.2 Azonosító (tantárgykód)

BMEEOGMMS51

1.3 Tantárgy jellege

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Előadás (elmélet)	2

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Félévközi érdemjegy

1.6 Kreditszám

3

1.7 Tárgyfelelős

név	Dr. Ákos Török. Dr. Lajos Völgyesi
beosztás	Egyetemi tanár
email	torok.akos@emk.bme.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Geotechnika és Mérnökgeológia Tanszék

1.9 A tantárgy weblapja

<https://epito.bme.hu/BMEEOGMMS51>
<https://edu.epito.bme.hu/course/view.php?id=2064>

1.10 Az oktatás nyelve

magyar és angol

1.11 Tantárgy típusa

Szabadon választható a Szerkezet-építőmérnök (MSc) szakon

1.12 Előkövetelmények

1.13 Tantárgyleírás érvényessége

2020. február 5.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The subject focuses on the understanding of dynamic effects that are transferred from the geo-logical environment to the engineering structures. The students are getting familiar with geo-physics, rock stress and its interpretation and graphic representation, local and world-scale (Word Stress Map). The deformations caused by seismic waves in igneous, metamorphic and sedimentary rocks also form part of the subject, as well as deformations caused by historic earthquakes. A main topic is the understanding of the Earth's structural geology and seismicity with special emphasis on the Carpathian basin. The lectures will help in learning the detection methods of seismic waves and acquire the information content of the seismograms. By completing the course the students will be able to determine the parameters that are necessary for appropriate seismic design. Engineering seismological approach will help the students to place the structures in the geological environment allowing the minimal risk and reducing the cost by proper seismic design.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése után a hallgató

A. Tudás

1. knows the fundamentals of geophysics, Earth's magnetic and gravitational fields
2. knows the principles of rock stress
3. knows the faulted and folded structures and related rock deformations,
4. aware of the mechanisms of earthquake generation,
5. knows the detection and registration methods of earthquakes and the information content of seismograms
6. knows the seismic behaviour of rock types
7. aware of the historic seismic events and the role of engineering seismic
8. knows the seismicity of the Carpathian-Pannonian system, and the Earth in general
9. understand and recognize the seismic sensitivity of engineering structures,
10. knows the geodynamic risks and the parameters that are necessary for safe seismic design

B. Képesség

1. able to describe the seismic properties of rocks,
2. able to draw and graphically interpret the geological structures related to seismicity,
3. able to classify seismic waves and interpret their seismic effect,
4. able to understand the rock stress and can use it in the engineering design,
5. able to choose specific sites for waste disposal,
6. can prepare a list of the most important geological-geophysical parameters needed for seismic design
7. able to present an engineering geologically feasible seismic design
8. can read and interpret international references and written reports
9. able to express her/his thoughts orderly in written and oral.

C. Attitűd

1. improve her/his knowledge with continuous learning,
2. open to use the information technology tools,
3. pursue to know and use of the toolkit which need for the environmental geological problem solution,
4. pursue to the exact and errorless task solution.

D. Önállóság és felelősség

1. thinks through and solve independently the geodynamics related tasks and problems according to given sources,
2. consider logical steps and solutions in geodynamics
3. open to accept the critical comments,
4. use the systematic approaches in her/his mind.

2.3 Oktatási módszertan

Lectures, communication in written and oral form, use of IT tools and techniques, task solved independently and in groups as well, work organization techniques.

2.4 Részletes tárgyprogram

Week	Topics of lectures and/or exercise classes
1.	Earth's physics and geophysics.
2.	Rock stress (definition, measurements).
3.	Rock deformation, faulted and folded structures.
4.	Seismology, principles, mechanisms of earthquake generation, earth-quakes and deformation.
5.	Registration and evaluation of seismic waves, intensity, basin structure and Vs30 values
6.	Word Stress Map and local rock stresses in Hungary.
7.	Gravitational, magnetic and geothermal anomalies and their relationship with structures and seismicity.
8.	Structural geology and seismicity of the Earth and the Carpathian basin.
9.	Seismograms and their interpretation, most important parameters and surface acceleration.
10.	Seismic behaviour of igneous, metamorphic and sedimentary rocks, wave propagation in these rocks.
11.	Detection methods of seismic waves under laboratory conditions, longitudinal and transversal waves.
12.	Engineering seismology, detection of previous earthquakes, input geological parameters of seismic design
13.	Structures in geological environment, evaluation of seismic hazards.
14.	Reducing seismic risks and steps of seismic safe design in the frame of geodynamics.

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

1. Amadei, B, Stephansson, B.O. (1997) Rock Stress and Its Measurement. Springer
2. Ansal, A. (eds) (2004-2016): Geotechnical, Geological and Earthquake Engineering. könyvsorozat, Springer
3. Bath, M. (1979): Introduction to Seismology. Birkhauser
4. Fossen, H. (2016) Structural Geology (2nd ed.), Cambridge Univ. Press
5. Price, D.G.(2009): Engineering Geology, Principles and Practice. Springer
6. Rogers, N. (ed) (2007): An Introduction to Our Dynamic Planets. Cambridge Univ. Press

b) Online materials

1. Lecture notes

2.6 Egyéb tudnivalók

- 1) The topics lectures provide information on of Hungarian and international case studies re-lated to geodynamics.

2.7 Konzultációs lehetőségek

The instructors are available for consultation during their office hours, as advertised on the de-partment website. Special appointments can be requested via e-mail: torok.akos@epito.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 specified in clause 2.2. above, and the evaluation of student performance occurs via tests, homework assignments.

3.2 Teljesítményértékelési módszerek

Evaluation form	Abbreviation	Assessed learning outcomes
1. midterm test	MT1	A.1-A.5; B.1, B.2, B.6; C.2, C.4; D.3
2. midterm test	MT2	A.6-A.10; B.5-B.8; C.2, C.4; D.3
1. homework	HW	A.1-A.10; B.1-B.9; C.1-C.4; D.1-D.4

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
MT1	40%
MT2	40%
HW	20%
Sum	100 %

The midterm test is failed if the sum points of the two tests are less than the 50% of the obtainable points. In case of the homework to reach the 50% of the points is also required.

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

There is no signature for this subject.

3.5 Érdemjegy megállapítása

Determination of the final grade is according to the below described considerations:

There is no minimum requirement for the midterm tests separately; the sum results of the two midterm test have to reach at least 50% of the obtainable points.

The final grade is the average value of the result of the two midterm test and the homework weighted according to the clause 3.3.

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) There is no minimum requirement for the individual midterm tests therefore it cannot be retaken separately.
- 2) Homework – after the payment of the fee given in the regulation – can be submit with delay until 16.00 or in electronic format until 23.59 of the last day of the completion week.
- 3) The submitted and accepted homework can be corrected without any fee until the dead-line described in the point 2.
- 4) The two midterm test can be retaken in merged form in the completion week free of charge. In case of

correction the better result will be taking into account from the new and previous results.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/semester
contact hours	14×2=28
preparation for the courses	14×1=14
preparation for the tests	2×18=36
homework	12
Sum	90

3.8 A tárgykövetelmények érvényessége

2020. február 5.

Jelen TAD az alábbi félévre érvényes: