Geoscientific Foundations of Geodesy - BMEEOAFDT81

I. Subject Specification

1. Basic Data

1.1 Title

Geoscientific Foundations of Geodesy

1.2 Code

BMEEOAFDT81

1.3 Type

Module without associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Dr. Völgyesi Lajos
academic rank	Professor emeritus
email	volgyesi.lajos@emk.bme.hu

1.8 Department

Department of Geodesy and Surveying

1.9 Website

https://epito.bme.hu/BMEEOAFDT81
https://fiek2.mywire.org/course/view.php?id=3578

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Specialization in Structural Engineering (BSc) programme

1.12 Prerequisites

1.13 Effective date

1 September 2022

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2. Objectives and learning outcomes

2.1 Objectives

Geodesy is closely related to the various earth sciences, especially the different disciplines of geophysics. We can determine the theoretical shape of the Earth from our knowledge of the Earth's gravity field. The rotation of the Earth, its precession and nutation, causes the temporal variation of the geodetical and astronomical coordinates. The tectonic movements of the Earth also cause the various coordinates to change continuously and significantly, leading to the development of 4D geodesy.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. Is familiar with the terminology of earth sciences
2. Understands the relationship and interdependence of geodesy and earth sciences
3. Knows the concept and the geodetic significance of the field forces of the Earth, the inner structure and the rotation of the Earth
4. Understands the relationship between the shape and the gravity field of the Earth
5. Understands the reason of physical background of larger geoid anomalies and the time variation of geoid anomalies
6. Is aware of the physical basis of Earth's rotation, knows exactly the phenomenon of precession and nutation
7. Understands the relationship between the rotation and the equilibrium shape of the earth
8. Understands the changes in terrestrial and astronomical coordinates due to precession and nutation
9. Understands the significance of oceanography and meteorology in geodesy
10. Knows the global tectonics of the Earth
11. Understand the revolutionary importance of 4D geodesy

B. Skills

1. Is able to understand the relationship between geodesy and different earth sciences
2. Is able to understand the different geodetic subjects on the basis of his basic knowledge of earth sciences

C. Attitudes

1. Cooperates with the lecturer and fellow students in expanding the knowledge
2. Considers importance attending lectures and continuous mid-year learning
3. In addition to the compulsory curriculum, it expands its knowledge through continuous acquisition of knowledge

D. Autonomy and Responsibility

1. Carry out his studies with appropriate responsibility
2. Openly accepts well-founded critical remarks
3. Assists fellow students in preparation in necessary situations

2.3 Methods

Lectures

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	The role and significance of earth sciences in geodesy.
2.	Field forces of the Earth (gravity and geomagnetic field)
3.	Time variation of gravity and geomagnetic field
4.	The relationship between the Earth's force fields and its shape
5.	Inner structure of the Earth
6.	The physical background of larger geoid anomalies
7.	Rotation of the Earth, paleorotation, the equilibrium shape of the earth
8.	Changes in terrestrial and astronomical coordinates due to precession and nutation
9.	Role of oceanography in the geoid definition
10.	Geoid eustasy
11.	Importance of meteorology in geodesy
12.	Geodynamics
13.	Geoscientific foundation of 4D geodesy
14.	Consultation

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

- F.D. Stacey, P.M: Davis: Physics of the Earth. Cambridge, 2011.ISBN: 978-0-521-87362-8
- A.H. Cook: Physics of the Earth and planets. MacMillan, 1973. SBN: 333-10905-8
- L. Völgyesi: Geophysics. 2002. (In Hungarian) J-91226

2.6 Other information

2.7 Consultation

Consultation appointments by prior arrangement

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
		A.1-A.11; B.1-B.2; C.1-C.3; D.1-D.3

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

3.3 Evaluation system

Abbreviation	Score
Exam	100%
Sum	**100%**

3.4 Requirements and validity of signature

Active attendance at lectures

3.5 Grading system

Grade	Points (P)
excellent (5)	
good (4)	
satisfactory (3)	
passed (2)	
failed (1)	

3.6 Retake and repeat

In case of retaking an assessment the second result will be taken into account from the new and previous results.

3.7 Estimated workload

Activity	Hours/semester
contact hours	14×2=28
mid-year learning	14×3=42
preparation for the exam	20
Sum	**90**

3.8 Effective date

1 September 2022

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Inactive courses