

Course guide

2500003 - GECGEOGAPL - Applied Geology

Last modified: 01/10/2023

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2020). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, English

LECTURER

Coordinating lecturer: MARCEL HURLIMANN ZIEGLER, JOSEP MARIA SALVANY DURAN

Others: MARCEL HURLIMANN ZIEGLER, JOAN MARTÍNEZ BOFILL, JOSEP MARIA SALVANY DURAN, DANIEL TARRAGÓ MUNTÉ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14396. Basic knowledge of geology and morphology of the land and its application in problems related to engineering. Climatology. (Basic training module)

TEACHING METHODOLOGY

The course consists of 2 hours per week of classroom activity (large size group) and 1.6 hours weekly with half the students (medium size group).

The 2 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 1.6 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

Basic knowledge of geology, terrain morphology and climatology. Basic identification of rocks and their mechanical or hydraulic properties. Ability to identify the soil structure. Ability to interpret geological maps and make geological cross-sections from cartographic information and reconnaissance surveys.

- 1 Ability to identify a rock, as well as infer some basic mechanical or hydraulic properties.
- 2 Ability to identify the structure of the soil in the field, as well as infer some basic properties of rocks of structural, mechanical type and hydrological.
- 3 Ability to interpret geological maps and make geological cross-sections from cartographic information and reconnaissance surveys.

Basic knowledge of geology, terrain morphology and climatology and ability to apply it to engineering problems. Knowledge of mineralogy, and its role in the composition of rocks. Know the different types of rocks in nature: igneous rocks, sedimentary rocks and metamorphic rocks. Knowledge of structural geology, including faults and joints, as well as basic concepts of plate tectonics. Introduction to seismology. Knowledge of geomorphology and in particular the engineering implications.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	24,0	16.00
Hours small group	6,0	4.00
Self study	84,0	56.00
Guided activities	6,0	4.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

Topic 1 - Structure of the Earth and plate tectonics

Description:

Item 01 - Structure of the Earth
T2 - Plate tectonics and sismicity of the Earth

Full-or-part-time: 19h 12m

Theory classes: 8h
Self study : 11h 12m

Topic 2 - Minerals

Description:

T3 - Minerals

Full-or-part-time: 4h 48m

Theory classes: 2h
Self study : 2h 48m



Topic 3 - The igneous rocks

Description:

T4 - The igneous rocks

R1 - Practice of igneous rocks

Full-or-part-time: 4h 48m

Theory classes: 1h

Laboratory classes: 1h

Self study : 2h 48m

Topic 4 - Surface formations (soils)

Description:

T5 - Residual formations

T6 - Sedimentary formations

Full-or-part-time: 9h 36m

Theory classes: 4h

Self study : 5h 36m

Item 5 - Sedimentary rocks

Description:

T7 - Sedimentary rocks

R2 - Sedimentary rocks

Full-or-part-time: 4h 48m

Theory classes: 1h

Laboratory classes: 1h

Self study : 2h 48m

Topic 6 - Metamorphic rocks

Description:

T8 - Metamorphic rocks

R3 - Metamorphic rocks

Full-or-part-time: 4h 48m

Theory classes: 1h

Laboratory classes: 1h

Self study : 2h 48m

Item 7 - Structural geology

Description:

T9 - Structural geology
M1 - The topographic map
M2 - Monolayer maps
M3 - Maps with monoclinals
M4 - Maps with discrepancies
M5 - Maps with faults
M6 - Maps with folds
M7 - Multistructural maps

Full-or-part-time: 43h 12m

Theory classes: 4h

Practical classes: 14h

Self study : 25h 12m

First partial exam

Full-or-part-time: 4h 48m

Laboratory classes: 2h

Self study : 2h 48m

Item 8 - Geological studies applied to civil engineering

Description:

T10 - Surficial studies, geological mapping
T11 - Studies of subsoil, trenches, soundings and geophysics

Full-or-part-time: 19h 12m

Theory classes: 8h

Self study : 11h 12m

Item 9 - The rock massif

Description:

T12 - Matrix rock
T13- Discontinuities

Full-or-part-time: 12h

Theory classes: 5h

Self study : 7h

Item 10 - Geomechanical classifications

Description:

T12 - Geomechanical classifications

Full-or-part-time: 9h 36m

Theory classes: 4h

Self study : 5h 36m



Second partial examination

Full-or-part-time: 7h 11m

Laboratory classes: 3h

Self study : 4h 11m

GRADING SYSTEM

There will be two partial exams that are 35% of the grade each. The remaining 30% is calculated by the continuous assessment and deliveries.

In case of failure, you can opt for a re-evaluation exam, which in any case will include the entire subject. Only those who have taken all the evaluation tests during the semester will be eligible.

EXAMINATION RULES.

The partial exams will be face-to-face.

BIBLIOGRAPHY

Basic:

- Tarbuck, E.D.; Lutgens, F.K.. Ciencias de la Tierra : una introducción a la geología física [on line]. 10a ed. Madrid: Pearson Educación, 2015 [Consultation: 02/02/2021]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3937. ISBN 9788490352816.
- González Vallejo, L.I. [et al.]. Ingeniería geológica [on line]. Madrid: Prentice Hall, 2002 [Consultation: 30/04/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1237. ISBN 8420531049.
- Gutiérrez Elorza, M. Geomorfología. Madrid: Prentice Hall, 2008. ISBN 9788483223895.
- Salvany, J.M. Mapes geològics aplicats a les obres públiques [on line]. Barcelona: UPC, 2020 [Consultation: 22/10/2021]. Available on: <https://upcommons.upc.edu/handle/2117/327543>. ISBN 978-84-9880-844-5.
- Blyth, F.G.H.; De Freitas, M.H. A Geology for engineers. 7th ed. London: Edward Arnold, 1984. ISBN 0713128828.