1.4 CE0140 – Geology for Engineers

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL			
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT			
LEVEL OF STUDIES	UNDERGRADUATE			
COURSE CODE	**CE0140**	**SEMESTER**	**1**	
COURSE TITLE	**Geology for Engineers**			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background Course			
PREREQUISITE COURSES:	-			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in English language.			
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CIV162/			

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The objectives of this course are:

- To acquaint students with the fundamental concepts of geology.
- To study and understand the internal structure of the earth, the physical properties of common rocks, minerals and processes of minerals formation.
- To study igneous, metamorphic and sedimentary rocks with reference to their formation processes, identification, textural and structural features.
- To understand internal and external geological processes, weathering, erosion, geomorphological processes, water cycle, karst formation, soil formations and their behavior in engineering works.
- To study and identify different types of geo-materials like rocks, minerals, sediment and soil.
- To understand the various natural dynamic processes their influence on the surficial features, natural material and their consequences.

- To know the physical properties and engineering properties of rocks and minerals.
- To understand morphological slopes and effects of mass movements.
- To identify basic geological structures (e.g. faults, folds, discontinuities) and relate them to technical properties of rocks.
- To acquaint students with the basic principles of hydrogeology, groundwater movement and occurrence and types of aquifers.
- To acquaint students with the basic principles of geomorphology, surface hydrology and drainage basin.
- To acquaint students with the basic principles of earthquake genesis, active tectonics and volcanism.
- To understand the importance of geological studies and significance of geological investigations for civil engineering projects.
- To know the importance of topographic and geological maps for civil engineering projects.

Upon successful completion of this course, students will have:

- Basic knowledge of geology and applications in civil engineering projects.
- Knowledge and understanding of geological processes and types of rocks.
- In-depth knowledge and critical understanding of geological processes and their applications in civil engineering projects.

Specifically, students will be able to:

- Have adequate comprehension skills of understanding topographic and geological maps.
- Evaluate the geo-environment and geological hazards.
- Manage time in an appropriate manner.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;.

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
……
Others…

Specifically, students will be able to perform:

- Working in an interdisciplinary environment.
- Working in an international environment.
- Search, analysis and synthesis of data and information, using the necessary technologies.
- Respect for the natural environment.
- Production of free, creative and inductive thinking.
- Decision-making.
- Team work.
- Autonomous work.

(3) SYLLABUS

1. Fundamental concepts of Geology.
2. Internal structure of the earth, physical properties of common rock forming minerals, formation processes of minerals.
3. Igneous, metamorphic and sedimentary rocks with reference to their formation, identification, textural and structural features.
4. Internal and external geological processes, weathering, erosion, geomorphological processes, water cycle, karst formation, soil formations and their behavior in engineering works.
5. Geo-materials (rocks, minerals, sediment and soil).

6. Natural dynamic processes and their influence on the surficial features, natural material and their consequences.
7. Physical properties and engineering properties of rocks and minerals.
8. Morphological slopes and effects of mass movements.
9. Basic geological structures (e.g. faults, folds, discontinuities), properties and technical properties of rocks
10. Basic principles of hydrogeology, aquifers and groundwater movement.
11. Basic principles of geomorphology, surface hydrology, drainage basin.
12. Basic principles of earthquake genesis, active tectonics and volcanism.
13. Significance of geological investigations for civil engineering projects.
14. Topographic and geological maps for civil engineering projects.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using ICT, Communication and Electronic Submission.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of evaluation: Greek (in English for Erasmus students) Final written examination: 60 % Written work: 20 % Laboratory work: 20 % or Final written examination: 60 % Final written exams on laboratory work: 40 %

Activity	*Semester workload*
Lectures	39
Laboratory practice	26
Personal study	41
Classwork	34
Course total	**140**

(5) ATTACHED BIBLIOGRAPHY

Greek Bibliography:

1. Papanikolaou D., Sideris Ch. (2015) Geology. The Science of Earth. Patakis Publications. Athens. (in Greek)
2. Dermitzakis M., Lekkas S. (2003) Investigating the Earth. Gelbesis Publications. Athens. (in Greek)
3. Koukis G., Sabatakakis N. (2007) Geology of Construction Works. Papasotiriou Publications. Athens. (in Greek)

Foreign Bibliography:

1. Gokhale N. (1991) Manual of Geological Maps. CBS Publishers and Distributors. Delhi, India.
2. Ragan D. (1973) Structural Geology. An Introduction to Geometrical Techniques. Second Edition. John Wiley & Sons.

3. Singh P. (1990) Engineering & General Geology. S.K. Kataria & Sons. Clock Tower, Ludhiana.
4. Alexakis D., Kelepertsis A. (1998) The relationship between the chemical composition - quality of groundwater and the geological environment in the East Attiki area, Greece. Mineral Wealth, 109:9-20

Related academic journals:

1. Geology (Geological Society of America)
2. Geotectonics (Springer)
3. Environmental Earth Sciences (Springer)
4. Environmental Geotechnics (ice publishing)
5. Earth Sciences Research Journal (Universidad NACIONAL de Colombia)
6. Geoheritage (Springer)
7. Engineering Geology (Elsevier BV)
8. Geosphere (Geological Society of America)