COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY			
DEPARTMENT	ENVIRONMENTAL SCIENCES			
LEVEL OF STUDY	*Undergraduate*			
COURSE UNIT CODE	NEW **COURSE**	**SEMESTER**	8	
COURSE TITLE	MANAGEMENT OF GEOTECHNICAL STRUCTURES			
INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits			**WEEKLY TEACHNG HOURS**	**CREDITS**
THEORETICAL BACKGROUND			2	3
LABORATORY PRACTICE				
TOTAL			2	3
COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	SCIENTIFIC AREA: ENVIRONMENTAL PLANNING			
PREREQUISITE COURSES:	NO			
LANGUAGE OF INSTRUCTION &EXAMINATION/ASSESSMENT:	GREEK			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES			
COURSE WEBSITE (URL)				

(2) LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.
It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

The purpose of the course is the management of geotechnical projects and geo-constructions with ecological and environmental criteria. The cycle of work associated with the construction of such projects is complex and of particular interest, as it must combine both the object of the Civil Engineer's work and modern ecological and environmental views. After successfully attending the course, the students should be able to:

1. Understand the basic concepts developed in the lesson, as well as the principles on which its application is based.
2. Manage geotechnical projects after taking into account the knowledge gained from the course of soil mechanics.
3. Apply modern technologies of geotechnical engineering for the forecasting and prevention of failures of geotechnical works.
4. Participate in planning of geotechnical projects with knowledge of geotechnical engineering and environmental technology.
5. Acquire the ability to analyze the effects of seismic action on geotechnical projects.
6. Manage geotechnical projects after taking into account the required ecological and environmental parameters that govern their construction.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking
……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)
…….

- Adapting to new situations
- Working in an interdisciplinary environment
- Introduction of innovative research
- Respect for diversity and multiculturalism
- Environmental awareness
- Critical thinking
- Development of free, creative and inductive thinking

(3) COURSE CONTENT

1. Basic concepts of geotechnical engineering.
2. Types of geotechnical works.
3. Geotechnical works and Environment.
4. Slope-landslides and dams
5. Environmental geotechnical hazards and problems.
6. Effects of slope-landslide failure on the environment and technical works.
7. Slope-landslide protection measures.
8. Support Works.
9. Elements of Environmental Geotechnics.
10. Soil pollution.
11. Geological and geotechnical issues of sewer system design.
12. Experimental techniques in geomechanics. Improving the earth's climate.
13. Adaptation of geotechnical works to the environment.

(4) TEACHING METHODS-ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>• In-class lecturing
• Group discussions</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>• Powerpoint presentations
• Video presentations
• Communication via e-mail.
• E-class platform</td></tr>
<tr><td>COURSE DESIGN
Description of teaching techniques, practices and methods:
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.

The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</td><td><table><tr><th>Activity/Method</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Theory study</td><td>24</td></tr><tr><td>Group practice</td><td>25</td></tr><tr><td>Course total
(25 hours of workload per credit unit)</td><td>75</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures:

Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.

Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.</td><td><u>Evaluation can be done in either Greek or English language.
The final grade is the outcome of the following evaluations:</u>

• Written examinations: 70% of final grade
• Assignments: 30% of final grade

Final Grade = 70% (A) + 30% (B)</td></tr>
</table>

(5) SUGGESTED BIBLIOGRAPHY:

-***<u>Suggested bibliography</u>***

1. Kavvadas M.I. 2013. Environmental Geotechnical Data, Tsotra Publications, ISBN: 978-618-80741-0-1 (in Greek).
2. Komodromos A. (2012). Foundations-Supports. Kleidarithmos Publications, Athens, ISBN: 978-960-461-506-3 (in Greek).
3. Komodromos A. (2008). Computational Geotechnical Engineering. Soil-construction interaction. Kleidarithmos Publications, Athens, ISBN: 978-960-461-201-7 (in Greek).

4. Loizos A. (1964). "Lectures on soil engineering and foundations - Sloping of slopes" TEE, Athens (in Greek).
5. Marinos V. Geological Studies of Open Road Construction. Lesson 4 - Mineral Stability Studies. www.geo.auth.gr/courses/ggg/ggg881e/.../geologikes-meletes-4o-5o-mathima-site.pdf. Notes from the internet (in Greek).
6. Dakoulas P. (2008). Non-Linear 3D Analysis of the Construction, Completion and Seismic Response of Lithospheric Barriers (CFRD) - Important Parameters. University of Thessaly, Volos (in Greek).
7. Rozos D., Loupasakis K. (2012). Territorial concessions from over-pumping of aquifers in Greece. Mineral wealth 166, pp.33-46, Athens (in Greek).
8. Chouliaras I.G., (2015). Course Notes “Environmental Geotechnical”, Technological Educational Institution of Thessaly. Larissa, 2015.
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10. Barnes G. (2005), ¨Soil Mechanics¨, Εκδόσεις Κλειδάριθμος, ISBN: 960-209-883-X.
11. Dakoulas P. (1991). Stability of slopes and Earth Dams under Earthquakes: Concluding Remarks. Proceedings of the Second International Conference on Geotechnical Earthquakes Engineering and Soil dynamics, St.Louis, Missouri, March 11-15, Vol 3 , p.p. 2157.
12. Dawson E.M., Roth W.H. and Drescher A. (1999). Slope stability analysis by strength reduction. Geotechnique, 49 (6), p.p. 835-840.
13. Dunkan J.M, Wright S.G., Brandon T.L. (2014). Soil strength and slope stability. Second edition. J. Wiley and sons, Inc. ISBN 978-1-118-65165-0. pp. 81-134, 259-271.
14. Engineering geologic assessment of the slope movements (2013)–NAESS, Natural Hazards and Earth System Sciences 13, 1113-1126, 2013 p.p. 1-14.
15. Newmark N.M. (1965). Effect of earthquakes on dams and embankments, Geotechnique, Vol. 15, No 2, London, England, June, p.p. 139-160.
16. Prakash S. and Dakoulas P. (1994). Grand failures under Seismic Conditions, American Society of Civil Engineers, New York, p.p. 260.
17. Safeland (2012). Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies.

-<u>Complementary bibliography</u>