

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	MRE505	<b>SEMESTER</b>	5
<b>COURSE TITLE</b>	GEOCHEMISTRY		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures		2	2
Lab exercises		2	2
<b>Total</b>		<b>4</b>	<b>4</b>
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Required, Special background		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uowm.gr/courses/MRE143/">https://eclass.uowm.gr/courses/MRE143/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p><b>On successful completion of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Understand the geochemical analyses of soil, rock, water, biological material, and air samples and identify the evidence of the existence of ore deposits.</li> <li>• Interpret typical chemical analyses of rocks and minerals.</li> <li>• Design and interpret geochemical maps of critical areas of mining interest or environmental pollution mainly from heavy metals.</li> <li>• Develop geochemical adequacy mapping programs and over-sufficiency of natural mineral resources.</li> <li>• Apply geochemical research to contribute to the protection and restoration of the environment in mining and quarrying areas.</li> </ul>

- Contribute to the organization, development and operation of geochemistry laboratories aiming at ore deposit research and the study of environmental pollution in mining operations.
- Be knowledgeable about the protection of the environment in the context of sustainable mining and exploitation of mineral raw materials.

#### 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?*

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

The course aims at:

Search, analysis and synthesis of data and information

Working independently

Production of free, creative and inductive thinking

### (3) SYLLABUS

The modules in this course cover:

- **THEORY**

Introduction to Geochemistry, Geochemical Classification of Elements, Crystallochemistry, Distribution of Elements in the Earth's Crust and Sequential Replacement, Geochemical Dispersion, Geochemical Dispersion, Elements Indicators, Soil Geochemistry, River Sediments, Hydrogeochemistry, Biogeochemistry, Geochemistry of Gases, Weathering and Soil Formation. Trace elements in Soils, The Composition of Natural Waters and the Process of Rock Weathering, Geochemistry and Environment, Pollution of Heavy Metals by the Exploitation of Basic Metals and by Metallurgy, Consequences for the Human and the Environment, Geochemical Research and its Contribution to Environmental Protection, Instrumental and Analytical Geochemistry (AAS, XRF, NAA, HPLC, GC, ICP-MC, IR Spectroscopy, UV-, etc.)

- **LABORATORY**

Methods of geochemical analysis, Geochemical survey, Statistics Data processing, Analytical Geochemistry, Geochemistry of river sediments, Geochemical anomalies, Soil geochemistry, Biogeochemistry, Geochemical research hydrocarbons, Lithogeochemistry, Hydrogeochemistry. Quantitative and qualitative determination of mineralogical phases and heavy metals.

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b></p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	Face to face	
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b></p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Use of data projector, asynchronous training platform – eclass, laboratory education.	
<p style="text-align: center;"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>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.</i></p> <p><i>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</i></p>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	55
	Lab work	25
	Lectures study	20
	<b>100</b>	
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p><i>Language of Assessment: Greek</i></p> <p><i>Evaluation methods:</i></p> <p><i>Theory: 50% Final Written Examination (Short Answer Questions, Essay Development Questions).</i></p> <p><i>Laboratory: Laboratory Exercises, Oral Examination, Written Examination 50%</i></p> <p>Assessment criteria are provided in the course page on the eclass platform and are available to students from the start of the semester.</p>	

#### (5) SUGGESTED BIBLIOGRAPHY

<p>- Suggested bibliography:</p> <p><b>Βιβλία στο Εύδοξο</b></p> <p><i>ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΟΡΥΚΤΟΛΟΓΙΑ</i>  <i>Κωδικός Βιβλίου στον Εύδοξο: 91711862</i>  <i>Συγγραφείς: Αθανάσιος Γκοντελίτσας</i>  <i>Τύπος: Δωρεάν Ηλεκτρονικό Βοήθημα / Σημειώσεις</i>  <i>Διαθέτης (Εκδότης): ΑΘΑΝΑΣΙΟΣ ΓΚΟΝΤΕΛΙΤΣΑΣ</i></p> <p><i>Εφαρμοσμένη, περιβαλλοντική και ενόργανη γεωχημεία</i>  <i>Κωδικός Βιβλίου στον Εύδοξο: 86198186</i>  <i>Έκδοση: 1η/2019</i>  <i>Συγγραφείς: Σεραφείμ Γ. Σαββίδης</i>  <i>ISBN: 978-618-84448-2-9</i>  <i>Τύπος: Σύγγραμμα</i>  <i>Διαθέτης (Εκδότης): ΑΛΕΞΑΝΔΡΟΣ Σ. Ι.Κ.Ε.</i></p> <p><i>Περιβαλλοντική Γεωχημεία των δυνητικά τοξικών μετάλλων</i>  <i>Κωδικός Βιβλίου στον Εύδοξο: 77119473</i></p>
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Έκδοση: 1η/2018

Συγγραφείς: Frederic Siegel, Κωνσταντίνος Σκόρδας, Νικόλαος Καντηράνης

ISBN: 978-960-9551-38-0

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): COPY CITY I.K.E.

Αρχές Περιβαλλοντικής Γεωχημείας

Κωδικός Βιβλίου στον Εύδοξο: 77115198

Έκδοση: 1/2011

Συγγραφείς: Nelson Eby

ISBN: 978-960-99858-6-4

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΣΠΥΡΙΔΩΝ ΚΩΣΤΑΡΑΚΗΣ

Εισαγωγή στη Γεωχημεία

Κωδικός Βιβλίου στον Εύδοξο: 68406899

Έκδοση: 1/2017

Συγγραφείς: Κ. C. Misra, Επιστ. Επιμ.: Α. Αργυράκη, Χρ. Στουραϊτή

ISBN: 978-960-546-732-6

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΠΕΔΙΟ ΕΚΔΟΤΙΚΗ, ΔΙΑΦΗΜΙΣΤΙΚΗ ΚΑΙ ΡΑΔΙΟΤΗΛΕΟΠΤΙΚΩΝ ΠΑΡΑΓΩΓΩΝ Α.Ε.

Εφαρμοσμένη, Περιβαλλοντική και ενόργανη Γεωχημεία

Κωδικός Βιβλίου στον Εύδοξο: 59394746

Έκδοση: 1/2012

Συγγραφείς: Σεραφείμ Γ. Σαββίδης

ISBN: 978-960-93-3759-5

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΑΛΕΞΑΝΔΡΟΣ Σ. Ι.Κ.Ε.

Οργανική Γεωχημεία

Κωδικός Βιβλίου στον Εύδοξο: 59374051

Έκδοση: 1η/2003

Συγγραφείς: Κελεπαρτζής Ε. Ακίνδυνος

ISBN: 960-319-219-8

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΜΑΡΙΑ ΠΑΡΙΚΟΥ & ΣΙΑ ΕΠΕ

Εφαρμοσμένη γεωχημεία

Κωδικός Βιβλίου στον Εύδοξο: 41958817

Έκδοση: 1η έκδ./2000

Συγγραφείς: Κελεπερτζής Ακίνδυνος Ε.

ISBN: 978-960-319-159-9

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΜΑΡΙΑ ΠΑΡΙΚΟΥ & ΣΙΑ ΕΠΕ

Γεωχημεία Πετρελαίου

Κωδικός Βιβλίου στον Εύδοξο: 41954964

Έκδοση: 1η/2014

Συγγραφείς: Πασαδάκης Νικόλαος

ISBN: 978-960-418-461-3

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε.

ΓΕΩΧΗΜΕΙΑ

Κωδικός Βιβλίου στον Εύδοξο: 38144136

Έκδοση: 5η/2014

Συγγραφείς: Στέργιου Θεοδωρίκα

ISBN: 978-960-89904-5-6

Τύπος: Σύγγραμμα

Διαθέτης (Εκδότης): ΓΡΑΦΙΚΕΣ ΤΕΧΝΕΣ «ΜΕΛΙΣΣΑ»

- Related academic journals:

- *Reviews in Mineralogy and Geochemistry*
- *Geochemistry, Geophysics, Geosystems*
- *Environmental Geochemistry and Health*
- *Organic Geochemistry*
- *Advances in Isotope Geochemistry*
- *Applied Geochemistry*
- *Chemie der Erde*
- *Aquatic Geochemistry*
- *Geochemistry: Exploration, Environment, Analysis*
- *Geochemistry International*
- *Bulletin of Mineralogy Petrology and Geochemistry*
- *Chinese Journal of Geochemistry*
- *Developments in Geochemistry*
- *Geochemistry (Beijing, China)*