COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	MRE704	SEMESTER	7
COURSE TITLE	INDUSTRIAL ROCKS AND MINERALS		

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
Lectures	3	4
Labs	1	1
Total	4	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*	Special *background*
PREREQUISITE COURSES:	There are no prerequisite courses
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://mre.uowm.gr/wp-content/uploads/sites/6/2019/07/%CE%9C%CE%9F%CE%A0704.pdf

(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*

Students should be able to:

- Recognize all the industrial rocks and minerals
- Be aware of their use and applications
- Implementation of quality assurance systems for all the industrial rocks and minerals
- Classification of them according to their use

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
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment

Decision-making *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Macroscopic recognition of all the Industrial Rocks and Minerals (I.R.M)
- Comprehension of their use and applications in industry
- Implementation of quality assurance systems for Industrial Rocks and Minerals
- Classification according to their use
- Be familiar with a wide range of applications
- Be aware of physical and mechanical properties of I.R.M
- Understanding the current trends in the field of I.R.M which is based on the new trend from products to solutions.

(3) SYLLABUS

Introduction and definitions of Industrial Rocks and Minerals:
Field characteristics - Classification - Environmental limitations. Suitability assessment attributes. Research and main uses and applications of ore deposits and Industrial Rocks and Minerals: Abrasives - Fertilizers and other Agricultural uses - Construction - Chemicals - Optical applications - Environmental uses. IRM: (barite, fluorite, asbestos, quartz, feldspar, talc, magnesite, clay, organo-clays, anionic clays (hydrotalcites) kaolin, bentonite, perlite, diatomites, emery, zeolites). Specific economic ore deposits: Refractory materials - ceramic materials - decorative rocks and materials, Environmental applications of Industrial Rocks and Minerals.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face, Distance learning, Lectures, Lab demonstration, Tutorials
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	E-Class, electronic communication, video demonstrations, intermediate exams via e-Class tools
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*	

Activity	*Semester workload*
Lectures	36
Lab	12
Tutorials	32
Self-study	20
Course total	***100***

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,*	Final exam (60%, minimum required grade =4/10), Multiple choice intermediate exam (20%), Homework (20%)

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.*	

(5) SUGGESTED BIBLIOGRAPHY

- *Suggested bibliography:*

-Περράκη-Λοίσιου, Θ. 2007. Βιομηχανικά ορυκτά και πετρώματα. Εκδόσεις ΕΜΠ. Αθήνα.
-Σαββίδη Σ. 2012. Άτλας Πετρωμάτων και ορυκτών. Αυτοέκδοση. Εύδοξος: 22684594
-Τσιραμπίδης, Αν. 2000. Ο Ορυκτός Πλούτος της Ελλάδος. Εκδόσεις Γιαχούδη: Μελενίκου 15, Θεσσαλονίκη.
-Μιχαηλίδης, Κ., Βαβελίδης, Μ. και Φιλιππίδης, Α. 1991. Σημειώσεις κοιτασματολογίας βιομηχανικών ορυκτών και πετρωμάτων. ΑΠΘ, Υπ. δημοσιευμάτων. Θεσσαλονίκη.
· Austin, G.S. (1982). Industrial rocks and minerals of the Southwest. A symposium on Industrial rocks and minerals of the Southwest, held May 12-15, 1981, in Albuquerque, New Mexico. New Mexico Bureau of Mines & Mineral Resources in Socorro, NM.
-Bates, R.L. (2000). Geology of the Industrial Rocks and Minerals. Dover Books on Earth Sciences.
- Carr, D. (1994). Industrial minerals and rocks.
-Edwards, R. and Atkinson, K. (1986). Ore Deposit Geology: Chapman and Hall
- Evans, A.M. (1987). An Introduction to Ore Geology, 2nd Ed. Blackwell · Evans, A.M., (1993). Ore Geology and Industrial Minerals, An Introduction, 3rd Ed. Blackwell · Guilbert, J.M. and Park, C.F. (1986). The Geology of Ore Deposits: Freeman
- Jensen, M.L. and Bateman, A.M. (1981). Economic Mineral Deposits, 3rd Ed.: Wiley International Editions
- Jessica Elzea Kogel, Nikhil C. Trivedi, James M. Barker, Stanley T Krukowsk (2006). Industrial Minerals & Rocks: Commodities, Markets, and Uses. 7th Edition, SME. Littleton Colorado USA.
- Kuzvart, M. (1984). Industrial minerals and rocks. Elsevier.
- Manning, D. (1995). Introduction to industrial minerals. Chapman and Hall.
- Stanton, R.L. (1972). Ore Petrology: McGraw-Hill.

- *Related academic journals:*

Industrial Minerals and Rocks - Elsevier
Rocks & Minerals - Taylor & Francis
Earth Science Journal - Springer