

BACHELOR'S DEGREE
GEOCHEMISTRY
 2ND YEAR OF STUDY, 1ST SEMESTER

COURSE TITLE	SYSTEMATIC MINERALOGY										
COURSE CODE	31020030020SL1112115										
COURSE TYPE	full attendance										
COURSE LEVEL	1 ST cycle (bachelor's degree)										
YEAR OF STUDY, SEMESTER	2 nd year of study, 1 st semester										
NUMBER OF ECTS CREDITS	6										
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)										
NAME OF LECTURE HOLDER	Assistant Professor Andrei Ionuț Apopei										
NAME OF SEMINAR HOLDER	Assistant Professor Andrei Ionuț Apopei										
PREREQUISITES	Crystallography, Basic Mineralogy										
A	GENERAL AND COURSE-SPECIFIC COMPETENCES										
	<p>General competences:</p> <ul style="list-style-type: none"> → Effectively using additional scholarly sources and assisted learning resources in order to devise a research paper on a topic pertaining to the academic discipline <p>Course-specific competences:</p> <ul style="list-style-type: none"> → Identifying, describing and defining the main classes of minerals in relation to the processes that generate them → Properly using specific instrumental methods for the identification and analysis of minerals → Using the knowledge acquired so as to explain and interpret the processes responsible for the genesis and properties of minerals 										
B	LEARNING OUTCOMES										
	<p>Upon successfully completing the discipline, students become capable of:</p> <ul style="list-style-type: none"> → describing the main classes of minerals → explaining their properties → using polarized optical microscopy → analysing an unknown mineral macroscopically and microscopically → understanding the chemistry and properties of rock-forming minerals so as to have the minimum background necessary for the comprehension of igneous, metamorphic and sedimentary processes and rocks 										
C	LECTURE CONTENT										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Week</th> <th style="width: 35%;">Title of lecture</th> <th style="width: 30%;">Teaching methods</th> <th style="width: 20%;">Duration</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Introduction. Systematics of minerals</td> <td>Lecture based on video projection, heuristic conversation</td> <td>2 hours; Deer et al., 1992; Wenk and Bulakh, 2004.</td> </tr> </tbody> </table>			Week	Title of lecture	Teaching methods	Duration	1	Introduction. Systematics of minerals	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004.
Week	Title of lecture	Teaching methods	Duration								
1	Introduction. Systematics of minerals	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004.								

2	Silicates. Subclass: nesosilicates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureşan and Benea, 2000
3	Silicates. Subclass: sorosilicates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureşan and Benea, 2000
4	Silicates. Subclass: cyclosilicates. Subclass: inosilicates – pyroxenes	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureşan and Benea, 2000
5	Silicates. Subclass: inosilicates – amphiboles	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureşan and Benea, 2000
6	Silicates. Subclass: phyllosilicates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
7	Silicates. Subclass: tectosilicates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
8	Sulphates and phosphates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
9	Carbonates	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
10	Halogens	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
11	Oxides and hydroxides	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
12	Sulphides and sulphosalts	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
13	Sulphides and sulphosalts	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureşan and Benea, 2000
14	Native elements	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004

D RECOMMENDED READING FOR LECTURES

Main references:

- Deer W. A., Howie R. A., Zussman J. (1992) - *An introduction to the rock-forming minerals*, 2nd edition. Longman Scientific and Technical, London, 696 p.
- Mureşan I., Benea M. (2000) - Mineralogie sistematică. Partea I-a. Ed. ETA Cluj-Napoca.
- Mureşan I., Benea M. (2001) - Mineralogie sistematică. Silicaţi naturali. Partea a II-a.

Ed. Casa Cărții de Știință, Cluj-Napoca.

- **Wenk Hans Rudolf, Bulakh Andrei (2004) - Minerals. Their constitution and origin.** Cambridge University Press, 646 p.

Additional references:

Websites: www.webmineral.com; www.ima-mineralogy.org;

Journals: *American Mineralogist*, *Canadian Mineralogist*, *Elements*, *Mineralogical Magazine*, *European Journal of Mineralogy*, *Mineralogy and Petrology*, *Physics and Chemistry of Minerals*, *Reviews in Mineralogy*

E

SEMINAR CONTENT

Week	Title of seminar	Teaching methods	Duration
1.	Revision: optical properties determined using parallel nicols	Identification under the petrographic microscope	2 hours
2.	Revision: optical properties determined using parallel nicols	Identification under the petrographic microscope	2 hours
3.	Revision: optical properties determined using crossed nicols	Identification under the petrographic microscope	2 hours
4.	Revision: optical properties determined using crossed nicols	Identification under the petrographic microscope	2 hours
5.	Minerals from the silicate class, subclass nesosilicates (olivine, garnets, zircon, titanite)	Observation/analysis of thin sections and observation of samples	2 hours
6.	Minerals from the silicate class, subclass nesosilicates (andalusite, disten (kyanite), sillimanite, staurolite)	Observation/analysis of thin sections and observation of samples	2 hours
7.	Minerals from the silicate class, subclass sorosilicates and cyclosilicates (epidote, zoisite (saulpate), beryl, tourmaline)	Observation/analysis of thin sections and observation of samples	2 hours
8.	Minerals from the silicate class, subclass inosilicates (pyroxenes)	Observation/analysis of thin sections and observation of samples	2 hours
9.	Minerals from the silicate class, subclass inosilicates (amphiboles)	Observation/analysis of thin sections and observation of samples	2 hours
10.	Minerals from the silicate class, subclass phyllosilicates (micas, chlorites, clay minerals)	Observation/analysis of thin sections and observation of samples	2 hours
11.	Minerals from the silicate class, subclass tectosilicates (quartz and feldspar)	Observation/analysis of thin sections and observation of samples	2 hours

	12.	Visit to the Mineralogy Museum	Debate	2 hours
	13.	Examples of carbonates, sulphates, phosphates, halogens, oxides and hydroxides	Observation/analysis of thin sections and observation of samples	2 hours
	14.	Minerals from the silicate class (revision)	Observation/analysis of thin sections and observation of samples	2 hours
	15.	Oral exam		2 hours
F	RECOMMENDED READING FOR SEMINARS			
	<ul style="list-style-type: none"> • Fleischer M., Wilcox R. E., Matzko J. J. (1984) - <i>Microscopic Determination of the Nonopaque Minerals</i>. U. S. Geol. Survey Bull., 1627, Washington, 453 p. • Deer W. A., Howie R. A., Zussman J. (1992) - <i>An introduction to the rock-forming minerals</i>, 2nd edition. Longman Scientific and Technical, London, 696 p. 			
G	EDUCATION STYLE			
LEARNING AND TEACHING METHODS	Lecture based on video projection, heuristic conversation, observation, analysis, debate			
ASSESSMENT METHODS	Written exam (35%) and continuous assessment (35%) (lecture-70%), oral exam and continuous assessment (seminar) – 30%			
LANGUAGE OF INSTRUCTION	English			