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

COURSE TITLE	BASIC MINERALOGY
COURSE CODE	31020030020SL1111201
COURSE TYPE	full attendance
COURSE LEVEL	1ST cycle (bachelor's degree)
YEAR OF STUDY, SEMESTER	1st year of study, 2nd 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 Buzatu
NAME OF SEMINAR HOLDER	Assistant Professor Andrei Buzatu
PREREQUISITES	Crystallography, Crystallographic Systems

A GENERAL AND COURSE-SPECIFIC COMPETENCES

General competences:

→ Effectively using additional scholarly sources and assisted learning resources in order to devise a research paper on a topic pertaining to the academic discipline

Course-specific competences:

→ Identifying, describing and defining the mascroscopic and microscopic properties of minerals
→ 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

Upon successfully completing the discipline, students become capable of:

→ describing the main physico-chemical characteristics of a crystalline structure
→ explaining the macroscopic properties of minerals
→ using polarized optical microscopy
→ analyzing an unknown mineral macroscopically and microscopically
→ understanding the chemistry and properties of minerals

C LECTURE CONTENT

Week	Title of lecture	Teaching methods	Duration
1	Introduction. History of Mineralogy	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh, 2004.

2	The crystallographic basis of Mineralogy (types of lattices, Pauling's rules, coordination theory, crystal field theory, crystal solutions, crystallochemical formula)	Lecture based on video projection, heuristic conversation	6 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureșan and Benea, 2001
3	Macroscopic properties of minerals (form and habit, cleavage and fracture, color, luster, transparency, specific gravity, hardness, tenacity)	Lecture based on video projection, heuristic conversation	8 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureșan and Benea, 2001
4	Electrical and magnetic properties of minerals. Mineral radioactivity.	Lecture based on video projection, heuristic conversation	2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureșan and Benea, 2001
5	The polarizing microscope. Optical properties of minerals.	Lecture based on video projection, heuristic conversation	6 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureșan and Benea, 2001
6	Mineral genesis	Lecture based on video projection, heuristic conversation	2 hours; Kerr Paul Francis (1977) *Optical mineralogy*. McGraw-Hill Inc., 492 p; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2001

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.
- **Kerr P. F. (1977)** *Optical mineralogy*. McGraw-Hill Inc., 492 p.;
- **Mureșan I., Benea M. (2000)** *Mineralogie sistematică. Partea I-a.* Ed. ETA Cluj-Napoca**.**
- **Mureșan I., Benea M. (2001)** *Mineralogie sistematică. Silicați 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: *Americal 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.	Form and habit. Cleavage and fracture. Color and streak.	Observation/sample analysis	2h; Wenk and Bulakh, 2004
2.	Specific gravity, hardness, magnetic and electrical properties. Mineral radioactivity.	Observation/sample analysis. Physical measurements (pycnometer, Geiger-Muller	4h; Wenk and Bulakh, 2004

			counter)	
	3.	The polarizing microscope	Observing and carrying out a microscope adjustment	2h; Wenk and Bulakh, 2004
	4.	Properties of minerals with parallel nicols – PPL (form and habit, cleavage, color and pleochroism, relief, inclusions)	Observation/analysis of thin sections and observation of samples	8h; Kerr, 1977; Fleischer et al., 1984.
	5.	Properties of minerals with crossed nicols – CPL (isotropy and anisotropy, interference colors, extinction angle, maclas)	Observation/analysis of thin sections and observation of samples	8h; Kerr, 1977; Fleischer et al., 1984.
	6.	Calculating the crystallochemical formula	Presenting the steps involved în calculating a crystallochemical formula Exercises	4h; Deer et al., 1992

F	RECOMMENDED READING FOR SEMINARS
	Fleischer M., Wilcox R. E., Matzko J. J. (1984) *Microscopic Determination of the Nonopaque Minerals.* U. S. Geol. Survey Bull., 1627, Washington, 453 p. **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. **Kerr P. F. (1977)** *Optical mineralogy*. McGraw-Hill Inc., 492 p; **Wenk Hans Rudolf, Bulakh Andrei (2004)** *Minerals. Their constitution and origin.* Cambridge University Press, 646 p.
G	EDUCATION STYLE

LEARNING AND TEACHING METHODS	Lecture based on video projection, heuristic conversation, observation, analysis
ASSESSMENT METHODS	Written exam (35%) and continuous assessment (35%) (lecture-70%), oral exam and continuous assessment (seminar) – 30%
LANGUAGE OF INSTRUCTION	English