Academic course description – systematic MINERALOGY

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| Bachelor’s DEGREE**GEOCHEMISTRY** 2nd YEAR OF STUDY, 1st SEMESTER |

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| **Course title** | **SYSTEMATIC MINERALOGY**  |
| Course code | 31020030020SL1112115  |
| Course type | full attendance |
| Course level | 1ST cycle (bachelor’s degree) |
| Year of study, semester | 2nd year of study, 1st 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** |
|  | **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 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
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| B | **Learning outcomes** |
|  | Upon successfully completing the discipline, students become capable of:* 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
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| C | **Lecture content** |
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| 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, Mureșan and Benea, 2000 |
| 3 | Silicates. Subclass: sorosilicates  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh; 2004, Mureșan 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, Mureșan 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, Mureșan and Benea, 2000 |
| 6 | Silicates. Subclass: phyllosilicates  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 7 | Silicates. Subclass: tectosilicates  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 8 | Sulphates and phosphates  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 9 | Carbonates  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 10 | Halogens | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 11 | Oxides and hydroxides  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 12 | Sulphides and sulphosalts  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 13 | Sulphides and sulphosalts  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004, Mureșan and Benea, 2000 |
| 14 | Native elements  | Lecture based on video projection, heuristic conversation  | 2 hours; Deer et al., 1992; Wenk and Bulakh, 2004 |

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| 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.
* 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:** *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** |
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| 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 (saualpite), 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 |

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| 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.
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| 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  |