Academic course description – igneous petrology

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

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| **Course title** | | **Igneous petrology** |
| Course code | | 31020030020SL1112223 |
| Course type | | full attendance |
| Course level | | 1ST cycle (bachelor’s degree) |
| Year of study, semester | | 2nd 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 | | 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 groups of igneous rocks in relation to the geological processes that generate them * Appropriately using the instrumental methods necessary for the quantitative and qualitative evaluation of igneous rocks * Appropriately employing the information acquired so as to explain and interpret the igneous processes involved in rock formation | |
| B | **Learning outcomes** | |
|  | Upon completing the discipline, students become capable of:   * describing the main groups of igneous rocks and the minerals that enter their   composition;   * explaining the genesis of igneous rocks * using petrogenetic diagrams * analyzing igneous rocks both macroscopically and microscopically * calculating mineralogical compositions based on chemical analyses of major elements,   so as to use ternary diagrams   * understanding the building of phase diagrams with 2-3 or 4 components and their role in   the study of igneous rocks | |
| C | **Lecture content** | |
|  | |  |  |  |  | | --- | --- | --- | --- | | Week | Title of lecture | Teaching methods | Duration | | 1 | Introduction. Magmas. The physico-chemical properties of magmas | Lecture based on video projection | 4h; Buzgar, 2009; Hall, 1996 | | 2 | The evolution of magmas: the differentiation between crystal-liquid, liquid-liquid and liquid-vapors | Lecture based on video projection | 4h; Buzgar, 2009; Hall, 1996 | | 3 | Magma consolidation. Experimental systems with 2 components | Lecture based on video projection | 4h; Buzgar, 2009; Hall, 1996 | | 4 | Magma consolidation. Igneous systems with 3 components | Lecture based on video projection | 6h; Buzgar, 2009; Hall, 1996 | | 5 | Magma consolidation. Igneous systems with 4 components | Lecture based on video projection | 1h; Buzgar, 2009; Hall, 1996 | | 6 | The influence of pressure upon magma crystallization | Lecture based on video projection | 3h; Buzgar, 2009; Hall, 1996 | | 7 | Igneous ores | Lecture based on video projection | 3h; Buzgar, 2009; Hall, 1996 | | 8 | The systematics and nomenclature of igneous rocks | Lecture based on video projection | 3h; Buzgar, 2009; Hall, 1996 | | |
| D | **Recommended reading for lectures** | |
|  | **Main references:**  **Buzgar N. (2009)** *Petrologie magmatică.* Ed. Tehnopres, Iași.  **Hall A. (1996)** *Igneous Petrology* (2nd ed.). Prentice Hall, Harlow*.*  **Additional references:**  **Carmichael I. S. E., Turner F. J., Verhoogen J. (1974)** *Igneous Petrology*. McGraw-Hill, New York.  **Clarke D. B. (1993)** *Granitoid Rocks*. Chapman & Hall, London.  **LeMaitre R. W. ( ed.) (1989)** *A Classification of Igneous Rocks and Glossary of Terms: Recommendations of the International Union of Geological Sciences, Subcommission on the Systematics of Igneous Rocks*. Cambridge University Press, Cambridge.  **Pitcher W. S.** (1997) *The Nature and Origin of Granite* (2nd ed). Chapman & Hall, London.  **Winter D. J. (2001)** *An Introduction to Igneous and Metamorphic Petrology*. Prentice Hall, New Jersey. | |
| E | **Seminar content** | |
|  | |  |  |  |  | | --- | --- | --- | --- | | Week | Title of seminar | Teaching methods | Duration | | 1 | Minerals in igneous rocks | Video projection, observation/analysis of thin sections | 2 hours; electron microscope | | 2 | The structure of igneous rocks | Video projection, observation/analysis of thin sections | 2 hours; electron microscope | | 3 | The granite family | Video projection, observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 4 | The granodiorite family | Video projection, observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 5 | The diorite-andesite family | Video projection, observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 6 | The syenite-trachyte family | Assessment based on thin sections and samples | 2 hours; electron microscope and samples | | 7 | The basalt-gabbro family | Video projection, observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 8 | The foid-bearic syenite-phonolite family | Video projection, observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 9 | Fieldwork | Observation/analysis of samples in the field | 2 hours; macroscopic samples | | 10 | Fieldwork | Observation/analysis of samples in the field | 2 hours; macroscopic samples | | 11 | Fieldwork | Observation/analysis of samples in the field | 2 hours; macroscopic samples | | 12 | The foidite-pholidolite family | Observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 13 | Ultrabasic rocks | Observation/analysis of thin sections and samples | 2 hours; electron microscope and samples | | 14 | Calculation of QAP parameters. Tectono-magmatic diagrams | Lecture and case studies | 2 hours; geochemical diagrams | | |
| F | **Recommended reading for seminars** | |
|  | **Buzgar N. (2009)** *Petrologie magmatică.* Ed. Tehnopres, Iași.  **Hall A. (1996)** *Igneous Petrology* (2nd ed.). Prentice Hall, Harlow*.* | |
| G | **Education style** | |
| learning and teaching methods | | Lecture based on video projection, observation/analysis of thin sections and samples, case studies |
| assessment methods | | Continuous assessment (35%) and exam (30%) (lecture) – 65%, continuous assessment and paper presentation (seminar) – 30% |
| Language of instruction | | English |