

## SYLLABUS

1. Course title: **Current issues and methodology in geochemistry**
2. Course lecturer: **dr hab. Łukasz Kruszewski**
3. Field, type and level of studies, year of study: **geology, full-time doctoral studies, 2<sup>nd</sup> or higher year of study**
4. Course character: **elective** (see point B.1 in the *Curriculum of the full-time Doctoral Programme* – at least 4 ECTS points have to be gained during the studies)
5. Teaching method: **workshop and lab - traditional** (personal contact with the lecturer), **lecture – traditional and video conferencing**
6. Language: **Polish or English** (depending on the audience)
7. Course type and number of hours: **lecture (23 h), workshop (4 h), lab (3 h)**
8. Estimated amount of student's independent work: **20 h**
9. Total workload and number of ECTS points: **50 h, 2 ECTS**
10. Short description and main focus of the course:

The lecture concerns some basics and modern knowledge in the field of element behavior in both natural and anthropogenic environment. Beside theory, the lecture encompasses geochemistry analytical issues and analytical troubleshooting based on some examples. Modern geochemistry has largely developed and changed recently, including principles of some elements' distribution and occurrence modes – this will be discussed and some unique discoveries in this field will be shown. The latter concerns both Earth and extraterrestrial cases. The final lecture content is, however, dependent on the individual needs of the course participants
11. References:

Goldschmidt, V., 1937. The principles of distribution of chemical elements in minerals and rocks. The 7th Hugo Müller Lecture (delivered before the Chemical Society, 17th March 1937). *J. Chem. Soc. (resumed)*, "0", 655–673.

Parker, R.L., 1967. Composition of the Earth's Crust. In: Fleischer, M., *Data of Geochemistry*, 6th ed., Chapter D. Geological Survey Professional Paper 440-D, US Government Printing Office, Washington, 19 pp.

Fang, Z., Gesser, H.D., 1996. Recovery of gallium from coal fly ash. *Hydromet.*, 41, 187–200.

Makowska, D., Wierońska, F., 2006. Analysis of content of selected critical elements in fly ash. *Geosci. Eng.*, LXII(1), 13–36.

Brown, T., Walters, A., Idoine, N., Gunn, G., Shaw, R.A., Rayner, D., 2016. *Lithium*. MineralsUK – Centre for sustainable mineral development, British Geological Survey, Keyworth, Nottingham, UK, 39 pp.
12. Educational outcomes:

**KNOWLEDGE**: The participant gains knowledge on the modes of occurrence of elements in the nature. (S)he is familiar with modern geochemical issues.

**PRACTICAL SKILLS:** The participant is able to obtain and accordingly process geochemical data. (S)he is also capable of analyzing it.

**SOCIAL SKILLS:** The participant is ready for a critical estimation of the knowledge and contents, which is a basis for writing geochemical papers.

13. Evaluation of the educational outcomes: **written exam**

14. Criteria to complete the course: at least **80%** attendance, final grade depends on the exam results and evaluation of the student's commitment during the workshop and lab.