

## **ANALYTICAL CHEMISTRY**

### **Research of the analytical techniques suitable for dynamic online control.**

supervisor: prof. Dr. Yaroslav Bazel, DrSc.

study form: full time

Annotation: Investigation of analytical properties of novel reagents and complexes using optical probes, SIA and sensors. In-situ monitoring of complex-forming and oxidation-reduction processes being suitable for analytes determination. Evolvement of novel kinetic, catalytic, spectrophotometric, SIA methods for inorganic species and organic analytes determination in environmental samples, biological fluids and pharmaceuticals. Validation, chemometric evaluation of obtained results.

### **Development of novel miniaturized and automated analytical methods.**

supervisor: prof. Mgr. Vasil' Andruch, CSc.

study form: full time

Annotation: In recent years we can see that analytical chemists are showing a greater-than-ever interest in miniaturisation and automation of the analytical methods. This is evidenced by the steadily growing number of publications devoted to this subject. The project is aimed to design of new schemes, technical and technological solutions for miniaturization and automation of analytical procedures; to propose the solutions enabling to overcome the disadvantages and drawbacks of microextraction techniques, the development of microextraction procedures with the use of ultrasound and vortex and the development of novel optical/visual sensors.

### **Mass spectrometry in the analysis of bioactive, functional, and geological materials.**

supervisor: doc. Ing. Viera Vojteková, PhD..

study form: full time

Annotation: Dissertation work will be focused on the application of technique of the quadrupole mass spectrometry with inductively coupled plasma (ICP-QMS) with the inserted collision-reaction (CRC). There will be developed the methods for trace analysis. ICP-QMS provides excellent detection limits for a large number of analytes, but there are also restrictions that limit its use. One of the major constraints is the occurrence of spectral interferences. The use of collision-reaction cell is one of the way for removing of spectral interferences in ICP-QMS. However, only multipole cells allow undisturbed spectral analysis in complex and variable sample matrices. Optimization of experimental conditions of the cell and comparison of the measurements using the independent method (SS-GF-AAS) will be the subject of experimental study in the frame of dissertation work.