

**Department:** Mining Engineering

**Division:** Mining Exploration

**Level and Major:** Ph.D., Mining Exploration

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**Course Title:** Advanced Analytical Methods

**Number of Credits:** 3

**Lecturer:** Dr. Abbas Maghsoudi

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### **Course Goals and Objectives**

The familiarity of students with sampling, Sample preparation, and Analytical Methods

### **Course Topics**

- ICP-OES
- ICP-MS
- Microprobe
- XRD
- Fluid Inclusion and Isotope
- Heavy Mineral
- Seminar
- Seminar
- Sampling
- Sample Preparation
- Duplicate Samples and Analytical precision
- Flux
- Titration and Gravimetric method
- Spectrophotometer and Flame Photometry
- AAS and Fire Assay
- XRF and INAA

### **Reading Resources**

- Ermagan, M.R., and Rafeie, 1995. Geochemical Analysis of Rocks and Minerals
- Echlin. P., 2009. Handbook of Sample Preparation for Scanning Electron Microscopy and X-Ray Microanalysis
- REED, S. J. B., 2005. Electron Microprobe Analysis and Scanning Electron Microscopy in geology. Cambridge University Press

- Thomas, R, 2004. Practical Guide to ICP-MS. CRC Press
- De Vivo, Belkin, H.E., and Lima, 2008. Environmental Geochemistry., 2008., Academic Press
- Rolinson, H.R., 1993, Using Geochemical Data: Evaluation, Presentation, Interpretation, Longman, UK. 352 pp. [Co-published by J. Wiley and Sons. Inc. in the USA
- Mirnejad, H., Lankarani, M. 2013. Analytical techniques in geosciences, University of Tehran press, (In Persian).
- Baqeri, H., 2010, Sampling and Analysis of mining and environmental sample, Esfahan university press.