

ICP-MS Analytical Techniques

ENVG 60500 – FALL 2011

Instructor: Dr. Antonio Simonetti
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Meeting time: 9:30–10:45 TR, 154 Fitzpatrick
Office hours: By appointment
Text: None; occasional hand-outs

Grades:

Lab Project (including seminar) – 30%
Final Exam – 35%
Lab manual/practicals – 20%
Homework – 15%

Course Description:

Students are introduced to the analytical techniques associated with inductively coupled plasma - mass spectrometry (ICP-MS). Part of the course covers and discusses the theory of ICP-MS and multi-collector (MC)-ICP-MS instrumentation, as well as specialized sample introduction techniques (e.g. laser ablation). Time is spent in the ICP-MS lab getting to know machine tuning/setup techniques, ICP-MS and laser ablation software, and calibration protocols, and sample preparation techniques in the clean lab. Students shall spend a significant portion of the course conducting their independent projects. Graduate students are strongly advised to make this project related to their research.

Course Outline:

- Elements, Isotopes, and review of Periodic Table
- ICP-MS instrumentation
 - o What is a plasma?
 - o Ionization potential
 - o Different types of mass spectrometers
- Factors Affecting the quality of ICP-MS analyses
 - o Matrix effects
 - o Interferences

- Instrumental Drift
- Calibration Strategies
- Data Reduction
- Lab Practicals