

## GEOS 693 Fundamentals of Inductively Coupled Plasma Spectroscopy - Spring 2012

Lecture: Room 233 Reichardt      Mondays 9:15-11:15AM

Labs: 164 Reichardt      TBD

Instructor: Karen J. Spaleta      kjspaleta@alaska.edu      147 Reichardt, x5452

Office hours by appointment

### Course Description, Goals and Outcomes:

This class is a hands on introduction to ICP-MS techniques. Lectures will focus on theoretical aspects of the technique, generating high quality data from sampling to final data reduction, with an emphasis on QC & QA methods. Students will also be expected to critically evaluate and lead discussions of ICP-MS applications in their field of study.

The laboratory portion will deal with the mechanics of running the instrument and developing methods as a class for liquid analysis of fruit products, and solid analysis of a geological sample. At the end of the course students should be capable of running the instrument independently, generating quality data, and developing a method for use in their own research.

### Tentative Schedule:

Week	Date	Lecture	Lab
1	Jan 23	Safety, Introduction to ICP-MS	Laser Start up, Tune & Shutdown
***Monday, January 23: Literature Discussion Dates Assigned***			
2	Jan 30	HF Safety, Calibration Schemes	Making Standards/Method Setup
3	Feb 6	Fundamentals of Plasmas; LD	Liquid Start up, Tune & Shutdown
4	Feb 13	Method Development, QA/QC; LD	Microwave Digestion
5	Feb 20	Liquid Data reduction; LD	Running Liquid Samples
***Monday, February 20: Applications Presentations Topic Confirmations***			
6	Feb 27	[LC & LC data reduction]; LD	[Running LC Samples]
7	Mar 5	Other types of ICPs & MSs; LD	Cleaning & Maintenance
***Monday, March 5: Rough Draft w/Bibliography Due***			
Spring Break	Mar 12	No class	No Lab
8	Mar 19	Applications presentations	Laser Sample Prep
9	Mar 26	Laser Ablation; LD	Running LA Samples
Easter Hiatus	April 2	No class	No Lab
10	April 9	Project Proposal Presentations	LA Data Reduction
***Monday, April 16: Final Paper Due***			

## Course Materials:

**Text:** Practical Inductively Coupled Plasma Spectroscopy by John R. Dean

## Other Resources:

- ICP Mass Spectrometry Handbook Edited by Simon M. Nelms
- Inductively Coupled Plasma-Mass Spectrometry : Practices and Techniques by Howard E. Taylor
- Practical Guide to ICP-MS : A Tutorial for Beginners, 2nd ed. by Robert Thomas
- Inorganic Ventures Website <http://www.inorganicventures.com/tech/guides/>
- Laser Ablation ICP-MS in the Earth Sciences: Current Practices and Outstanding Issues edited by Paul Sylvester

**PPE:** Laboratory safety glasses and clean lab coats will be required during lab activities. The lab has several to loan out, but you may be more comfortable in your own.

## Grading Procedure:

Literature Discussion	10%	
Problem Sets	10%	
Labs	30%	
Application Presentation	15%	
Project Proposal	35%	(Rough Draft 10%, Paper 20%, Presentation 5%)

**Literature Discussion:** Each student will be expected to select an ICP-MS methods paper and lead an informal class discussion of the paper lasting 25 minutes. Papers should be selected and distributed to the class 1 week prior to the assigned discussion date.

**Problem Sets/Assignments:** Several problem sets and readings will be assigned. Many will be preparation for a subsequent lab.

**Labs:** The lab sections will teach the mechanics of preparing samples, running the instrument, and analyzing the data. The liquid samples will be analysis of fruit and fruit products, and the laser samples will be geological in nature.

**Application Presentation:** Students will select and prepare a 15 minute presentation on application(s) of ICP-MS to their field of study.

**Project Proposal:** Students will write a proposal for developing a method for using the ICP-MS pertinent to your research. This should include a motivation, literature review, justification for method chosen, estimates of costs including CRMs, sample preparation, instrument accessories and instrument time. I do not want to read more than 10 pages. Rough drafts will be due Monday, March 5, and returned with feedback prior to spring break. Students will give a 15 minute presentation with 5 minutes for questions and feedback at the last class. The proposal will be due the following week on Monday, April 16. This will enable you to revise your proposal based on the feedback of your peers.

**Disability Services:** The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) in order to provide reasonable accommodation to students with disabilities.

**I expect students to follow the Student Code of Conduct.**  
(<http://www.uaf.edu/catalog/current/academics/regs3.html>)