

# Course Syllabus

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## **GLY 6932** **Instrumental Methods in Geochemistry**

### **COURSE SYLLABUS**

**Fall 2022**

#### INSTRUCTORS:

Dr. George Kamenov

Dr. Ann Heatherington

Dr. Jason Curtis

#### Offices, email addresses, office hours, office phone:

George Kamenov – [kamenov@ufl.edu](mailto:kamenov@ufl.edu), 363 Williamson Hall, 846-3955, T 9:30-11:30am and F 9-11am and by appointment

Ann Heatherington – [aheath@ufl.edu](mailto:aheath@ufl.edu), 107D Williamson Hall, 352-538-4330, Tues and W 10-12 AM and by appointment

Jason Curtis – [curtisj@ufl.edu](mailto:curtisj@ufl.edu), 372 Williamson Hall, 392-2296, M 9-11am and W 9-11am, and by appointment

Class hours – individual work to be determined by instructors and individual students

Classrooms –

Lectures in Williamson Hall 241

Lab work in Department of Geological Sciences research labs

Heatherington – 118, 103, 303 and 304 Williamson Hall

Kamenov – 302, 324 and 333 Williamson Hall

Curtis – 330 and 336 Williamson Hall

Course credit – 1

Course section – 17H5

***It is advisable that the student already has a scientific project that requires the use of the analytical instruments in the Department of Geological Sciences before enrolling in the class. Consult the instructor(s) if you do not have a specific project but still want to take the class. In such cases a project will be assigned to you by the instructor(s).***

1. Description – This course is designed to train students in sample preparation and the use of one or more of the analytical instruments in the Department of Geological Sciences. These instruments include a scanning electron microscope (SEM), an X-Ray fluorescence spectrometer (XRF), an inductively coupled plasma-mass spectrometer (ICP-MS), a multi-collector inductively coupled plasma-mass spectrometer (MC-ICP-MS), a thermal ionization mass spectrometer (TIMS), one of several stable isotope mass spectrometers and one of two laser based stable isotope analyzers. Students will learn to operate the instruments that relate to their individual projects.
2. Course Objectives –The class will allow students to get one-on-one training how to prepare samples and perform analysis on the state of the art analytical instruments in the Department of Geological Sciences. They will also learn the basic principles behind the analytical techniques. While learning the instrument the students will be able to analyze the samples for their specific project.
3. Course Topics – Laboratory work on student's specific project samples.
4. Textbook – none
5. Course materials – sample preparation protocols will be provided by the instructors.
6. Grading plan – Final grades will be assigned on the basis of the student's work on the specific project.
7. For students with disabilities - Students requesting classroom (lab room) accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

**GLY6932 Instrumental Methods Fall 2022 schedule**

**Williamson Hall Room 214, 3rd Period (9:35-10:20 AM)**

**08/24/22—no class**

08/31/22 – Introduction to class, project for each student (George)

09/07/22 – Safety training for using the labs in the Department of Geological Sciences.  
(Ann Heatherington)

09/14/22- General X-Ray fluorescence theory (Heatherington)

09/21/22 – XRF sample preparation, instrumentation, and analysis (Heatherington)

09/28/22 – SEM sample preparation, instrumentation, and analysis (Heatherington)

10/5/22 – MC-ICP mass-spectrometry instrumentation and Traditional and Non-Traditional Isotope analyses, including TIMS (George)

10/12/22 – Laser-Ablation MC-ICP-MS U-Pb dating of zircons and other U-Th minerals, data reduction with “CALAMARI” and “ISOPLOT”, concordia, standards, errors, detection limits (George)

10/19/22 – ICP-MS elemental (major and trace) analyses, including standard selection and preparation, high-resolution work, errors, detection limits (George)

10/26/22 – Stable Isotope mass-spectrometry instrumentation and analysis (Jason)

11/02/22- Mineral separation lab procedures (Heatherington)

11/09/22 –Clean Lab sample preparation for trace elements and isotopes for ICP-MS/TIMS (George)

In addition to the above lectures, individual work on selected individual projects throughout the semester - time determined by instructors and individual students and locations will be the Geological Sciences research labs.