

**Lecture:** M-W 8:30-9:45 pm WRI C223

**Instructor:** Shichun Huang

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Office hours: Monday 2-3 PM; Wednesday 2-3 PM; and by appointment

**Course Description:** This course is lecture format, open to graduate students. It focuses on igneous petrology, trace element geochemistry, and non-traditional stable isotope geochemistry, with their important applications in igneous and metamorphic processes on the Earth and in the Solar System, including origin of igneous rocks, relation of magma types to tectonic settings, physical properties of magmas, application of trace elements and isotopes to petrogenesis, modeling of crystal fractionation and partial melting, and phase diagrams. There are no formal prerequisites, but be prepared to learn (or relearn) math, physics, and chemistry. This course also involves in-class discussion of important literatures in the field of high-temperature geochemistry and petrology. The discussion of applications will be limited so that this course will complement existing courses, such as Topic in Advanced Geochemistry, Stable Isotope Geochemistry, Radiogenic Isotope Geochemistry, and Igneous and Metamorphic Petrology.

**Learning Outcomes:** After successfully completing this course, students will

1. be familiar with modern geochemical tools, including major and trace element, and isotope geochemistry;
2. be able to apply these tools investigating geochemical and cosmochemical problems;
3. have a general knowledge of the Solar System and its planetary system.

**Grades:** Final grades will be computed as follows:

In-class discussion and exercise	25%
Presentation	25%
Mid-Term Exam	20%
Course Final Exam	30%

**Attendance and Makeups:**

1. Attendance to both lecture and lab are **required**.
2. **No make-up exams, make-up quizzes, or make-up exercises.** The only **possible** exceptions are medical, military or university excuses. Formal documents are required. The instructor must be consulted and will make the final decision.
3. Required reading means that you are responsible for knowing the assigned material. Your instructor may test you on that material even if it has not been covered in lecture.
4. **No extra credit will be given.**

## COURSE SCHEDULE

January	23	W	Introduction: after the first three minutes; nucleosynthesis
	28	M	Solar abundance; Composition of the Earth
	30	W	Thermodynamics basic I
February	4	M	Thermodynamics basic II
	6	W	mantle potential temperature
	11	M	Trace element geochemistry I
	13	W	Trace element geochemistry II
	18	M	<b>President's Day (no class)</b>
	20	W	Trace element geochemistry III
	25	M	Trace element geochemistry IV
	27	W	Trace element geochemistry V
March	4	M	Crystal fractionation I
	6	W	Crystal fractionation II
	11	M	Crystal fractionation III
	13	W	<b>Mid-term</b>
	18	M	<b>Spring break (no class)</b>
	20	W	<b>Spring break (no class)</b>
	25	M	Crystal fractionation IV
	27	W	Crystal fractionation V
April	1	M	Mantle Heterogeneity I
	3	W	Mantle Heterogeneity II
	8	M	Eclogite problem I
	10	W	Eclogite problem II
	15	M	Ti-in-zircon thermometer I
	17	W	Ti-in-zircon thermometer II
	22	M	P-T conditions of mineral inclusions I
	24	W	P-T conditions of mineral inclusions II
	29	M	Diffusion I
May	1	W	Diffusion II
	6	M	Diffusion III
	8	W	Diffusion IV
	13	M	<b>Final Week</b>

**Changes to Syllabus:** The above lecture schedule is tentative; adjustments to the schedule of topics and reading assignments may be made in accordance with the rate of progress in the classroom. The instructor also reserves the right to change a lecture topic to reflect world events. Students will be provided with an updated syllabus if significant changes are necessary.

**Late Assignments:** Homework exercises, labs, and pre-labs are due at the beginning of class (lab assignments and pre-labs are due at the beginning of lab each week). Exercises, labs, and pre-labs can be turned in for a penalty up until a week from the assigned due date. Assignments over a week late will not be accepted and result in a zero in the gradebook. If the instructor is not available late assignments can be brought to the office in LFG 104 where the office staff will place it the instructor's mailbox.

**Learning Environment** - The classroom is intended to be a place of learning. As such, and as specified in the UNLV Undergraduate Catalog, no pagers, cell phones, or other potentially disruptive devices are allowed in either lecture or laboratory. Student usage of laptop computers, recording equipment, or similar devices is only allowed with explicit permission of the instructor, and is restricted to taking notes for this course. Disruptive behavior including, but not limited to those described above, chatting, sleeping, watching video, playing games or texting may result in an administrative withdrawal from the course.

**Administrative Drops/Classroom Conduct** - You are required to be familiar with university policies and procedures in the current UNLV Undergraduate Catalog. Importantly, we follow the policies on Administrative Drops/Classroom Conduct as stated in the most recent UNLV Undergraduate Catalog. Any student that does not comply with these requirements, and conducts themselves in a manner that is disruptive and interferes with the right of other students to learn, or of the instructor to teach will be administratively dropped from the course.

**Non-enrolled guests** - Students are not allowed to bring guests, including children to either lecture or laboratory.

**Final Examinations** – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at:  
<http://www.unlv.edu/registrar/calendars>.

**Please see this link for select, useful information for students:**

[https://www.unlv.edu/sites/default/files/page\\_files/27/SyllabiContent-MinimumCriteria-2018-2019.pdf](https://www.unlv.edu/sites/default/files/page_files/27/SyllabiContent-MinimumCriteria-2018-2019.pdf)