Earth Sciences 4001Y – Planetary Science Field School

Instructor: Dr. Gordon Osinski (gosinski@uwo.ca; +1-519-661-4208; room 1050 B&G)

When: May 01 to May 12 2017. Note: a 3-hour introductory lecture will be held in January 2017 (date to be decided upon in discussion with registered students) and one of the main assignments (see below) must be completed *prior* to the field school.

Where: Arizona and Utah, USA (various locations).

Prerequisites: ES 2001 or 2200 or 2232. Unless you have either the requisites for this course or written special permission from your Academic Counsellor to enrol in it, you may be removed from this course and it will be deleted from your record. If this occurs after the deadline (see below), you will loose your deposit.

Cost: $1,600. A $600 deposit is required by November 01 2016. Contact cpsx@uwo.ca for the link to pay online. The price includes travel to Arizona plus all accommodation, vehicle rental, park access, course material costs, and evening meals. The full amount is payable by March 01 2017. Note that a limited number of $1,000 to $2,000 scholarships are available to students through the Global Opportunities Awards program (deadline November 15th 2016).

Logistics: Travel details will be shared with participants once confirmed. Accommodation in the field will mainly be tents with one or two nights in shared motel rooms. Students should be prepared for camping, long days in the field and the potential for no showers or proper toilet facilities for up to 3 nights in a row. On some days there will be hikes of up to 18 km in length so students are encouraged to prepare accordingly. A limited amount of camping equipment is available for rent to those students who do not possess their own.

Course Objectives and Description:

The principal objective of this course is to provide participants with an interdisciplinary field studies experience with an emphasis on comparative planetology through the study of terrestrial analogues. Students will learn the following skills: 1) the synthesis, understanding and presentation of "state of the art" knowledge on planetary surface processes; 2) an ability to draw together information from a wide variety of subject areas in planetary sciences to address issues relevant to the discipline; and 3) field training in the recognition and mapping of various different rock types and of the relationships between them. At the end of the course, students will be able to: 1) assimilate information and data from a wide range of planetary science disciplines (astronomy, geochemistry, geography, geology, geophysics, and physics); 2) understand how complex problems in planetary sciences are tackled by scientists and

determine the present flaws in our understandings; 3) prepare field guides on relevant topics; and 4) generate simple interpretive geological maps of planetary bodies.

The goal of this course is to provide students with an interdisciplinary field studies experience with an emphasis on comparative planetology through the study of terrestrial analogues. Terrestrial analogues are places on Earth that approximate the geological and environmental conditions on the Moon, Mars and other planetary bodies, either at the present-day or in the past. This course will introduce students from a wide range of backgrounds to various aspects of planetary science, with an emphasis on planetary surface processes. The topics of astrobiology and planetary materials will also be integrated into this field program. This course will develop relationships and collaboration between students from very different backgrounds, unified in their pursuit of planetary science.

One of the major areas of research in planetary science is in the acquisition and compilation of data from spacecraft in orbit around a particular planetary body and the subsequent interpretation of these images in a geological context. On Earth, this technique is typically called Remote Predictive Mapping (RPM) and is commonly used in regions of the world that are large, difficult to access and under-explored (e.g., Canadian Arctic). The "predictive maps" can be used to guide geologists during fieldwork, which is obviously not currently possible in planetary science. During this course, students will generate a map of a field area that will be submitted prior to the field section of this course. The site will then be visited in order to provide students with the important ground-truth data that invariably is lacking in planetary science studies.

Course Format:

The main focus of the course will be a 12-day residential field experience examining various localities in northern Arizona (AZ) and southern Utah (UT), to take place in May 2017. This region of the Midwestern United States is a world-renowned environment for comparative planetology. Field stops will focus on meteorite impact cratering (e.g., Meteor Crater, AZ; Upheaval Dome crater, UT), volcanism (e.g., Sunset Crater volcanic field, AZ), and canyon and valley formation (e.g., Canyonlands National Park, UT). Many of the locations to be visited are considered world-class terrestrial analogues for the Moon and Mars. Images from previous field schools can be found here: https://www.flickr.com/photos/gordonosinski/albums/72157644546108913

Course Materials:

Readings will be provided to students in the introductory lecture. A field guide will be provided for the course. Students will be responsible for compiling some of the content for the field guide (see below).

Course Evaluation (summary):

Students registered in the course will be evaluated as follows:

Course Participation	10%
Presentation	10%
Image Interpretation Exercise	30%
Field Exercises	20%
Field Notebooks	20%
	100%

Course Evaluation (details):

Class Participation – 10%

Each student is expected to actively contribute to all class discussions. Students are encouraged to read widely beyond the content of the field guide and prescribed readings and bring own readings and experiences into the class discussions. It is expected that each student will come prepared to debate,

defend, and critique the readings and the field guide content. Participation also includes contributing to the daily life of the field school (e.g., cooking, cleaning dishes, putting up tents, etc.).

Presentation – 10%

Each student will give a short 5 minute presentation in the field on a topic provided by the Instructor at the January meeting.

Image Interpretation Exercise – 30%

For this exercise, students will be provided with a suite of satellite images of a site in northern Arizona or southern Utah. Students will use these images to generate an interpretive geological map – a.k.a remote predictive map – and a simple geological history of the area. This map and geological history are due **5 pm May 02 2017 (i.e., the first day of the field school).** Any work not handed in by the deadline will automatically be deducted 5% within the first 24 hours and 5% for each subsequent day late. The map and geological history will account for 20% of the final mark. During the course, the site will then be visited and students will be asked to provide a brief (2 page) report as to how their image-based map differed, or not, from their interpretations following fieldwork. This report will be worth 10% and is due **5 pm May 17 2017.**

Field Exercises – 20%

A series of short exercises will be handed out in the field at the various stops. Together, these exercises will be worth 20% of the final mark.

Field Notebooks – 30%

Students will be expected to take detailed notes and sketches while in the field. These notebooks will be collected on the final day of the course and graded.

Academic Honesty Statements and Absences:

Assignments: Assignments must be submitted both by hardcopy and electronically on the assigned due date and will not be accepted late, except under medical or other compassionate circumstances (see below). Submitting a late assignment without appropriate documentation will result in a zero (0) grade.

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Absences/Missed Exams/Assignments: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the

Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: http://www.uwo.ca/univsec/handbook/appeals/medical.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: https://studentservices.uwo.ca/secure/medical_document.pdf

Academic misconduct: Academic Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com). Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.