Western Science

Department of Earth Sciences

PLANETSC 9605L – Planetary Surface Processes Field School

1. Course Information

When: May 05 to May 17 2026. Note: a 3-hour introductory lecture will be held in February 2026 (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, Utah and Nevada, USA (various locations).

Registration and Cost (Western Graduate Student): This is a summer term course so you won't be able to officially enroll until April. Until this time and to secure a place, the payment of the ***deposit*** (see below) will be considered ***registration*** in the course.

The ***cost*** for this course is **$1,400**. A **$500 deposit** is required by **December 15 2025.** The price includes all accommodation, vehicle rental, park access, course material costs, and evening meals, but does ***NOT*** include flights to Las Vegas. Students are expected to make their own way to Las Vegas to be ready to depart at 12:30 pm on May 05 2026. The full amount is payable by **February 01 2026.** Note that a limited number of $1,000 to $2,000 scholarships are available to students through the Global Opportunities Award program. For MSc and PhD students in the Collaborative Specialization in Planetary Science and Exploration, the Institute for Earth and Space Exploration also offers support for field schools through the Experiential Learning Award.

Registration and Cost (Graduate Student at another Ontario University): Students at other Ontario universities are welcome on this course if there is sufficient space. The payment of the ***deposit*** (see below) will be considered ***registration*** in the course.

The Ontario Visiting Graduate Student Plan allows a graduate student registered at a university in Ontario (Home University) to take graduate courses at Western (Host University) without completing further admission formalities. Interested students must complete an Ontario Visiting Graduate Student Application available ***at their current university*** and return it to their ***home department*** for approval.

The ***cost*** for this course is **$1,400**. A **$500 deposit** is required by **December 15 2025.** The price includes all accommodation, vehicle rental, park access, course material costs, and evening meals, but does

NOT include flights to Las Vegas. Students are expected to make their own way to Las Vegas to be ready to depart at 12:30 pm on May 05 2026. The full amount is payable by **February 01 2026.**

Registration and Cost (Graduate Student at another non-Ontario University): Students at other Canadian or international universities are welcome on this course if there is sufficient space. The payment of the ***deposit*** (see below) will be considered ***registration*** in the course.

The ***cost*** for this course is **$1,750**. A **$500 deposit** is required by **December 15 2025.** The price includes all accommodation, vehicle rental, park access, course material costs, and evening meals, but does ***NOT*** include flights to Las Vegas. Students are expected to make their own way to Las Vegas to be ready to depart at 12:30 pm on May 05 2026. The full amount is payable by **February 01 2026.**

Registration and Cost (Professional): Researchers and other professionals are welcome on this course if there is sufficient space. The payment of the ***deposit*** (see below) will be considered ***registration*** in the course.

The ***cost*** for this course is **$2,750**. A **$500 deposit** is required by **December 15 2025.** The price includes all accommodation, vehicle rental, park access, course material costs, and evening meals, but does ***NOT*** include flights to Las Vegas. Participants are expected to make their own way to Las Vegas to be ready to depart at 12:30 pm on May 05 2026. The full amount is payable by **February 01 2026.**

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.

List of Prerequisites

In order to participate in this field school knowledge of basic rock types and planetary surface processes are necessary. An undergraduate degree in an Earth Sciences-related field and/or PLANETSC 9603 (Planetary Science Short Course) and/or GEOL 9635 (Planetary Surface Processes), or similar will provide the necessary background (contact Dr. Osinski to discuss).

2. Instructor Information

Dr. Gordon Osinski (gosinski@uwo.ca; +1-519-661-4208).

3. Course Syllabus, Schedule, Delivery Mode

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 13-day residential field experience examining various localities in northern Arizona (AZ) and southern Utah (UT), to take place in May 2024. 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

4. 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).

5. Methods of Evaluation

Students registered in the course will be evaluated as follows:

Course Participation	10%
Scientific Engagement	10%
Field Guide	20%
Image Interpretation Exercise	30%

Field Exercises	20%
Field Notebooks	10%
	100%

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.).

Scientific Engagement – 10%

One of the most rewarding and exciting aspects of Earth and planetary science is going into the field. In this class, students will visit some spectacular localities around Arizona and Utah. As part of this class, students will share their experiences in the field by using social media (X/Twitter, Instagram, or Bluesky). Students can use their own personal account or may wish to create a new Twitter account for the purposes of this class. All posts must include the hashtag #PS9605 in order to be counted and ensure that all posts are public. A recommended minimum number of posts is one per day; however, posts will be graded according to quality rather than mere quantity. For students not comfortable using X/Twitter, Instagram, or Bluesky, an alternative must be discussed with Dr. Osinski.

Field Guide – 20%

Each student will be responsible for putting together a description for one site on the field course and for introducing that site to the entire group while in the field. A complete set of instructions for preparing this guide section will be provided during the introductory lecture. Proper spelling, grammar and sentence structure are required for guide. Any paper not handed in by the deadline will automatically be deducted 5% within the first 24 hours and 5% for each subsequent day late. The written field guide section will account for 15% of the final mark and the presentation in the field is worth 5%. The written field guide sections are due **5 pm March 31 2026**.

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 01 2026.** 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%.

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 – 10%

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.

6. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf

Students should note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences must be submitted to the Academic Counselling office of a student's Home Faculty.**

7. Academic Policies

The website for Registrarial Services is http://www.registrar.uwo.ca.

In accordance with policy, http://www.uwo.ca/its/identity/activatenonstudent.html, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Electronic devices: Calculators, phones and other electronic devices are not permitted nor required for exams.

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/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism is a **serious academic offence**. The UWO Senate Academic Handbook defines plagiarism as "The act of appropriating the literary composition of another, or parts or passages of his writings, or the ideas or language of the same, and passing them off as the product of one's own mind." Students must write their assignments in their own words. Whenever students take an idea, or a passage from another source, they must acknowledge their debt by using proper referencing. For more information see Scholastic Offence Policy in the Western Academic Calendar.

TURNITIN: 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).

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help. Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or genderbased violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html

To connect with a case manager or set up an appointment, please contact support@uwo.ca

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/ .

Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiplechoice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the USC, http://westernusc.ca/services .