Undergraduate Course Outline Form

Fall 2017, Winter 2018 and Summer 2018 Semesters

Revised June 27, 2017 - JV

Instructions

* **The attached form is to be used for submitting course outlines electronically to the Chair, Director or Associate Director of your academic unit. This form is formatted and structured to be compliant with AODA requirements.**
* **Please note that all course outlines must be reviewed and approved by the Chair, Director or Associate Director of your academic unit prior to distribution.**
* **This form is to be used for all undergraduate courses.**
* **Please do not modify the format of this form when submitting it to your department for review. Formatting changes (but NOT content changes) can be made to the version published for student use.**
* **Detailed instructions and guides are provided in text and are also prefaced with an asterisk (\*). Please replace this text in your final version.**
* **Content for each section (e.g. lecture content, grading policy, etc.) can be cut and pasted from existing course outlines.**
* **The completed forms will be transferred to an electronic archive. In subsequent semesters instructors will be able to load, edit and update their course outlines on-line.**

**IMPORTANT:**

**PLEASE NOTE THAT ASSIGNMENT DATES AND GRADE WEIGHTINGS CANNOT BE ALTERED DURING THE SEMESTER EXCEPT UNDER THE PROVISIONS OF SENATE POLICY.**

**A MINIMUM OF ONE GRADED ASSIGNMENT OR TEST MUST BE RETURNED TO STUDENTS PRIOR TO THE FORTIETH CLASS DAY.**

# Course Outline Form: Fall 2017

## General Information

**Course Code: ENVS 3220**

**Course Title:**

**Terrestrial Chemistry**

**Course Description:**

<http://www.uoguelph.ca/academiccalendars/>

This course surveys the behaviour of elements in the Earth's surface environments, encompassing soils and saturated (wetland, lake, river) sediments. The course is focused on understanding the factors that control the chemical processes governing soils and freshwater sediments through the reactions of the elements and molecules that they contain. Students will extend their fundamental understanding of chemistry to the materials of the Earth's upper crust.

**Credit Weight:**

0.5

**Academic Department (or campus):**

School of Environmental Sciences

**Campus:**

Guelph

**Semester Offering:**

Fall 2017

**Class Schedule and Location:**

Lectures MW 12:30-13:20 ROZH 107

Seminar F 15:30-17:20 ALEX 309

## Instructor Information

Instructor Name: Dr. Susan Glasauer

Instructor Email: Glasauer@uoguelph.ca

Instructor Phone and Extension: (519) 824-4120 ext. 52453

Office location and office hours: Alexander 321; M 4:30-5:30

## GTA Information

GTA Name:

GTA Email:

GTA office location and office hours:

## Course Content

### Specific Learning Outcomes:

[Associate Vice President Academic Webpage](http://www.uoguelph.ca/vpacademic/avpa/outcomes/)

[Learning Outcomes Resources](http://www.uoguelph.ca/vpacademic/avpa/pdf/LearningOutcomes.pdf)

[Course Specific Learning Outcomes](http://www.uoguelph.ca/vpacademic/avpa/outcomes/coursespecific.php)

Students who pass the course will be provided with opportunities to:

1. Understand how biotic and abiotic components of soils and sediments control element chemistry.

2. Select and apply appropriate analytical methods to characterize soil and sediment chemistry.

3. Critically evaluate information pertinent to soil and sediment chemistry presented in scientific, technical and popular formats.

4. Communicate ideas and information pertinent to soil and sediment chemistry and demonstrate accurate use of scientific terminology and notation.

5. Select and apply appropriate quantitative methods to solve problems pertinent to terrestrial chemistry.

6. Understand soil and sediment chemistry in the broader contexts of inorganic chemistry and geochemistry.

7. Apply information that is learned about soil and sediment chemical processes to develop treatment approaches for contaminated soil and sediment.

### Lecture Content:

The course will follow the schedule of lectures, assignments and midterms shown on the following page.

Course schedule for lectures, seminars, assignments and midterms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Date** | **Lect. #** | **Topic** | **Recommended Reading** | **Seminars and Due Dates** |
| 1 | Sept 8 |  | Scope of Terrestrial Chem. | MESS 1-6;32-37 | Intro, Unit exercise |
| 2 | Sept 11 | 1 | Element occurrence, species  Terrestrial elements | MESS 6-11  MESS 11-31 | Back of the envelope |
| Sept 13 | 2 |
| 3 | Sept 18 | 3 | Terrestrial elements  Minerals in sediments: 1°, 2° | MESS 11-31  Bohn 4; MESS 55-65 | **ASSIGN 1**  Minerals, Bowen |
| Sept 20 | 4 |
| 4 | Sept 25 | 5 | Clays minerals  Metal oxides, hydration, pzc | Bohn4 | Field trip – Fletcher Creek |
| Sept 27 | 6 |
| 5 | Oct 2 | 7 | Weathering: mineral decay Weathering; organic matter | MESS 129-133  MESS 155-165 | Mineral ID |
| Oct 4 | 8 |
| 6 | Oct 11 | 9 | Evolution of organic matter | MESS 177-187  MESS 226-229 | Organic acids, L-B  **ASSIGN 2** |
|  |  |
| 7 | Oct 16 | 10 | Water: ideal solvent  Metal hydrolysis, ionic potential | MESS 207-221  MESS 221-225 | Ionic strength & activity |
| Oct 18 | 11 |
| 8 | Oct 23 | 12 | Carbonic acid (L-B)  Ion speciation, complexes | MESS 226-232  MESS 232-236; 256-259 | **MIDTERM** |
| Oct 25 | 13 |
| 9 | Oct 30 | 14 | Mineral dissolution & precipitation | MESS 289-298  MESS 303-311; 334-340 | Assessing mineral reactions |
| Nov 1 | 15 |
| 10 | Nov 6 | 16 | Life without oxygen  Redox reactions | SCH 242-270 | **ASSIGN 3**  Redox exercise |
| Nov 8 | 17 |
| 11 | Nov 13 | 18 | Wetlands for remediation  Surface reactions | MESS 372-379  MESS 383-393 | Design a wetland |
| Nov 15 | 19 |
| 12 | Nov 20 | 20 | Surface charge density Charge models: EDL | MESS 394-402  MESS 402-408; 408-429 | Adsorption models |
| Nov 22 | 21 |
| 13 | Nov 27 | 22 | Acid soils  Mine waste | MESS 537; 541-557 | **ASSIGN 4**  TBA |
| Nov 29 | 23, 24 |

Students should be prepared to take notes in class by hand. Powerpoint is used on a limited basis only to reinforce select lecture material. Electronic devices (laptops, tablets) may be used in class only with instructor permission.

### Labs:

Not applicable

### Seminars:

Seminars take place on Friday and reinforce the topics of the course lectures for that week. Hands-on exercises are used to apply and extend key course concepts.

### Course Assignments and Tests:

[Course Outline Guidelines: Checklist](http://www.uoguelph.ca/vpacademic/avpa/checklist/)

| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| --- | --- | --- | --- |
| ASSIGN 1 | Sept. 22 | 8 | 1,3,4,5,6 |
| ASSIGN 2 | Oct. 13 | 8 | 1,3,4,5,6 |
| ASSIGN 3 | Nov. 10 | 8 | 1,3,4,5,6 |
| ASSIGN 4 | Dec. 1 | 8 | 1,3,4,5,6,7 |
| Field trip | Sept. 29 | 0 | 1,2,5 |
| Midterm | Oct. 27 | 28 | 1,3,4,5,6, |
| Final | TBA | 40 | 1,2,3,4,5,6,7 |

Additional Notes (if required):

Assignments complement the seminar discussions and are due in the seminar on Fridays.

The midterms take place during the seminar period on October 27. Students may use the entire two hour period to complete it.

### Final examination date and time:

TBA

### Final exam weighting:

35%

[Examination Regulations](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-exam.shtml)

## Course Resources

### Required Texts:

### Recommended Texts:

Soil and Water Chemistry, an Integrative Approach, 2nd Edition. Michael E. Essington. CRC Press, 2015.

This textbook is available on library reserve.

Other recommended reading will be posted on the D2L website for the course.

### Lab Manual:

### Other Resources:

Any additional reading will be posted on the D2L site for the course.

Electronic materials from the lectures and seminars will be posted on D2L after the lecture only.

### Field Trips:

The field trip will be to the Fletcher Creek Ecological Reserve, approximately 20 km south of Gueph, on September 29. Transportation will be by student vehicles or by rental van. If rental vans are used, students will be required to pay a small amount to cover the cost (estimated to be around $10/person).

### Additional Costs:

## Course Policies

### Grading Policies: [Undergraduate Grading Procedures](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-grds-proc.shtml)

Assignments will be submitted during the seminar period as shown in the course schedule. The midterm will take place during the seminar period on Oct. 27.

**Policy on Late Assignments:** Making up a missed exam or assignment requires a doctor's note or equivalent. Late assignments will be penalized at a rate of 20% markdown per day after the due date.

**Copies of out-of-class assignments:** Keep paper and/or other reliable electronic back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### Course Policy on Group Work:

Group work will be allowed only where explicitly assigned by the instructor.

### Course Policy regarding use of electronic devices and recording of lectures:

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the written permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Phones and laptops are distractions not just for the people using them, but for others sharing the same space. A Canadian study showed that students attempting to multi-task using laptops in the classroom did much worse than peers using pencil and paper to take notes. Even worse, students sitting next to the multi-taskers also suffered significantly ("Students' use of laptops in class lowers grades: Canadian study". Globe and Mail, August 14, 2013).

The use of laptops, tablets and cell phones, including checking messages, is prohibited during class time. Please leave the room if you need to use your phone. Laptops are essential for some students to take notes, but they create a distracting space within the classroom when not used for notetaking. You must discuss your use of an electronic device for taking notes with Dr. Glasauer prior to using it in the classroom.

## University Policies

### Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml).

### Academic Misconduct:

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml).

### Accessibility:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the [Student Accessibility Services website (http://www.uoguelph.ca/csd/)](http://www.uoguelph.ca/csd/).

### Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](https://courseeval.uoguelph.ca/) **for more information.**

### Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III (Schedule of Dates) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml).

## Additional Course Information

**Commitment to the course:**

This course is worth 0.5 credits. According to University policy, you should plan on spending up to 12 hours per week engaged with this course, including lectures and seminars. That leaves around 8 hours to complete the reading and class assignments and to study the lecture material outside of class meetings. If you have invested this amount of time and still feel like you're struggling to keep up, please make an appointment to see me.