# Course Outline Form: Winter 2021

## General Information

**Course Code:** PBIO\*4530

**Course Title:** Plants and Environmental Pollution

**Course Description:**

This course will use the ecological risk assessment framework to study the responses of plants to environmental contaminants, mainly pollutants found in air, soil and water. The curriculum will cover characterization of exposure and effects, as well as practical application of these concepts. This course will also discuss on how to use plants to improve air, water and soil environment qualities (i.e. phytoremediation).

**Credit Weight:** 0.5

**Academic Department (or campus):** School of Environmental Sciences

**Campus:** Guelph

**Semester Offering:** W21

**Class Schedule and Location:** LEC Tues and Thur 11:30AM - 12:50PM, Remote Delivery - Synchronous.

## Instructor Information

Instructor Name: Dr. Youbin Zheng

Instructor Email: yzheng@uoguelph.ca

Office hours: Due to the pandemic, the best way to contact me is through email and we can schedule Zoom meetings as needed.

## Course Content

### Specific Learning Outcomes:

At the end of this course, successful students will be able to:

1. Characterize and describe 8-10 common environmental pollutants (e.g., ozone, SO2, NO2, NO, particulate, acid deposition, heavy metals), including their sources, chemical and physical characteristics, current and historical concentrations, and regional and global distributions.
2. Understand and describe how plants are exposed to, and the uptake paths of, common environmental pollutants in natural and man-made environments.
3. Identify and describe the responses (e.g., visible symptoms, growth and yield) of plants to 8-10 common environmental pollutants.
4. Understand the mechanisms of different plants (e.g., indoor and outdoor plants) in removing or degrading common environmental pollutants, and apply these mechanisms in green infrastructures (e.g., living walls, green roofs and constructed wetlands) for environmental quality improvement.
5. Demonstrate enhanced critical thinking skills through critiquing current scientific literature, evaluating other students’ presentations and participating in lectures and in-class discussions.
6. Demonstrate enhanced communication skills through in-class presentations and critiquing fellow students’ presentations.
7. Exhibit improved professional and ethical behavior towards diverse scientific ideas and academic opinions through presentations, group discussions and evaluating presentations by other students.

### Lecture Content and tentative schedule:

|  |  |  |
| --- | --- | --- |
| Week | Date | Topic |
| 1 | Jan 12 | Introduction |
|  | Jan 14 | Risk assessment framework. Introduce presentation topics and students start to form teams. |
| 2 | Jan 19 | Intro to gaseous pollutants and plants. Decide which group is going to work on what topic for presentation. |
|  | Jan 21 | Intro to gaseous pollutants and plants. Ozone & plants |
| 3 | Jan 25 | Ozone & plants. |
|  | Jan 27 | How to write & read scientific paper/report. Will be tested in the exam(s). |
| 4 | Feb 2 | NOx & plants. |
|  | Feb 4 | NOx & plants. |
| 5 | Feb 9 | SO2 & plants. |
|  | Feb 11 | SO2 & plants. Discuss about presentation evaluation again. |
| 6 | Feb 22 | Particulate & plants/air pollution combination effects on plants. Presentation 1, 2 (P1, 2: 20 min each presentation). |
|  | Feb 25 | Midterm Exam. |
| 7 | Mar 2 | How to use plants to improve air quality; Green infrastructure (e.g. green roof, living wall) and environmental remediation. P 3, 4. |
|  | Mar 4 | Green infrastructure (e.g. green roof, living wall) and environmental remediation. P 5, 6. |
| 8 | Mar 9 | Intro to metal and plants, including methods for studying plant response to metal pollutants. P7, 8. |
|  | Mar 11 | Intro to metal and plants, including methods for studying plant response to metal pollutants.  P9, 10. |
| 9 | Mar 16 | Metal availability, uptake, transportation and accumulation. P11, 12 |
|  | Mar 18 | Metal availability, uptake, transportation and accumulation. P13, 14. |
| 10 | Mar 23 | Metal availability, uptake, transportation and accumulation. P15, 16. |
|  | Mar 25 | Metal availability, uptake, transportation and accumulation. P17, 18. |
| 11 | Mar 30 | Effects of metals on plants. P 19, 20. |
|  | Apr 1 | Effects of metals on plants. |
| 12 | Apr 6 | Environmental remediation |
|  | Apr 8 | Wrap up. |

### Course Assignments and Tests:

|  |  |  |  |
| --- | --- | --- | --- |
| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| Discussion & engagement |  | 10 | 5, 6, 7 |
| Presentation (group) | **Submit presentation (PDF) no later than the next noon after the presentation** | 30 | 1, or 2, or 3 or 4, and 5, 6, 7 |
| Midterm Exam | Feb 25 | 25 | 1, 2, 3, 4, 5 |
| Final Exam | 08:30AM - 10:30AM (2021/04/16) | 35 | 1, 2, 3, 4, 5 |

Additional Notes (if required):

## Course Resources

### Required Texts:

There is no textbook for this course. Some readings will be posted.

## Course Policies

### Grading Policies:

Late penalty for assignments is 20% per day. If you cannot hand in an assignment, etc. for a valid reason, please let the instructor know.

### Course Policy on Group Work:

Group work is allowed for the group presentations, but the midterm and final exams have to be completed independently.

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

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

## 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

N/A