# Course Outline Form: Winter 2016

## General Information

**Course Title:** ENVS\*4070 Pollinator Conservation

**Course Description:**In this course students will explore the ecology of pollination with an emphasis on the roles animals play in pollen movement. Students will critically examine hypothesized drivers of regional, national and global pollinator declines, and the range of potential strategies suggested to mitigate or reverse these declines. Students will examine the efficacy of a wide range of pollinator conservation strategies in different geographical, ecological and economic contexts to help them build an understanding of the available toolbox for conservation.

**Credit Weight:** 0.50

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

**Campus:** Guelph

**Semester Offering:** W16

**Class Schedule and Location:** Tuesday & Thursday, 1300-1420. MCKN, Room 233

## Instructor Information

Instructor Name: Professor Nigel Raine

Instructor Email: [nraine@uoguelph.ca](mailto:nraine@uoguelph.ca)

Office location and office hours: EC Bovey building, Rm 2227; Office hours by appointment (please e-mail in advance to determine a mutually convenient meeting time).

## GTA Information

GTA Name: n/a

GTA Email:

GTA office location and office hours:

## Course Content

### Specific Learning Outcomes:

| Course Learning Outcomes | Major/Specialization Learning Outcomes | U of G Undergraduate Learning Outcomes |
| --- | --- | --- |
| 1. Define and describe the process of pollination, its importance for plant reproduction, the maintenance of wild plant biodiversity and crop production. | 1 | Critical & Creative Thinking  Literacy |
| 2. Describe using correct taxonomic names the diversity of flower visiting animals and pollinators, and how their behaviour and ecology influence floral traits and plant ecology. | 1, 8 | Critical & Creative Thinking  Literacy  Communication |
| 3. Explain how interspecific interactions can affect the structure of plant-pollinator communities through processes such as competition, facilitation and mutualism. | 1, 6, 7 | Critical & Creative Thinking  Literacy  Communication |
| 4. Describe the evidence suggesting pollinator declines around the world, and analyze the shortcomings of these data sets and hence our ability to predict future trends. | 2, 5, 7 | Critical & Creative Thinking  Literacy  Communication |
| 5. Explain how the key hypothesized drivers of declines could be affecting pollinator populations, and how these drivers might interact. Evaluate how the relative importance of drivers of decline might differ among key pollinator taxa. | 2, 3, 5, 9, 10 | Critical & Creative Thinking  Global Understanding  Professional & Ethical Behaviour |
| 6. Explain how environmental risks to pollinators are currently assessed and reported, and how these processes might be improved in future using current scientific literature. | 2, 4, 8 | Critical & Creative Thinking  Global Understanding  Professional & Ethical Behaviour |
| 7. Discuss the efficacy, and analyze the cost effectiveness, of pollinator conservation strategies around the world. Describe how the success of such schemes might be enhanced in the future. | 3, 4, 7, 10 | Critical & Creative Thinking  Global Understanding  Communication  Professional & Ethical Behaviour |
| 8. Explain, with specific examples, how policy engagement at regional, national and international levels can have positive (and negative impacts) on pollinator conservation. | 3, 4, 7, 10 | Critical & Creative Thinking  Global Understanding  Communication  Professional & Ethical Behaviour |

### Lecture Content:

Topic 1: What is pollination, and why is it important for plant reproduction, maintenance of wild plant biodiversity and crop production?

Topic 2. Survey the diversity of pollinators, ranging from specialist to generalist, and introduce pollination syndromes and functional guilds.

Topic 3. Pollinator behaviour – how foraging behaviour influences pollen transfer.

Topic 4. Plant-pollinator communities, competition for pollination, facilitation and pollination networks.

Topic 5. The evidence supporting global pollinator declines, and overview of the drivers of declines.

Topic 6. Land use change and agricultural intensification as drivers of pollinator declines.

Topic 7. Parasites, pathogens and invasive species as drivers of pollinator declines.

Topic 8. Climate change and interacting impacts of multiple drivers of pollinator declines.

Topic 9. How are environmental risks to pollinators currently assessed and reported, and how might these be improved?

Topic 10. Assessing the efficacy and cost effectiveness of pollinator conservation strategies around the world: how can the success of such schemes be enhanced?

Topic 11. How can policy engagement at regional, national and international levels effect positive change for pollinator conservation?

### Labs: Not applicable.

### Seminars: Not applicable

### Course Assignments and Tests:

| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| --- | --- | --- | --- |
| Midterm exam | 23 February (in class) | 25 | 1,2,3,4,5 |
| Pollinator conservation management plan (written coursework) | 1 March | 35 | 3,4,5,7 |
| Oral presentation (group project) | 1, 8, 15, 22 March (in class) | 15 | 7,8 |
| Final exam | 22 April | 25 | 5,6,7,8 |

### Final examination date and time: Friday 22 April 2016: 08:30-10:30

### Final exam weighting: 25%

## Course Resources

### Required Texts: None (but see other resources).

### Recommended Texts:

Dicks, L. V., D. A. Showler and W. J. Sutherland (2010). Bee Conservation: Evidence for the Effects of Interventions. Pelagic Publishing. ISBN 978-1-907807-00-8

Mader, E., M. Shepherd, M. Vaughan, S. H. Black and G. LeBuhn (2011). Attracting Native Pollinators: the Xerces Society Guide. Storey Publishing. ISBN 978-1-60342-695-4

Mader, E., J. Hopwood, L. Morandin, M. Vaughan and S. H. Black (2014). Farming with Native Beneficial Insects: the Xerces Society Guide. Storey Publishing. ISBN 978-1-61212-283-0

Waser, N. and J. Ollerton (2006). Plant-Pollinator Interactions: from Specialization to Generalization. University of Chicago Press. ISBN 978-0226874005

Willmer, P. (2011). Pollination and Floral Ecology. Princeton University Press. ISBN 978-0691128610

These titles have been requested for the library.

### Lab Manual: Not applicable.

### Other Resources:

The course content will draw heavily on peer-reviewed and grey literature sources. Where these are used full citation information will be provided in lectures and on courselink to allow students to access these sources.

No textbook is required reading, but recommended texts contain information highly relevant to the course and related topics.

### Field Trips: Not applicable.

### Additional Costs:

## Course Policies

### Grading Policies:

Midterm Examination: Make-up exams for a missed midterm examination will only be granted for medical reasons, documented by a Doctor’s note. If you are unwell and unable to sit a midterm examination, you are expected to promptly obtain a Doctor’s note and to contact the Instructor as soon as possible regarding the missed exam. An alternate exam time will be established between the Instructor and student, as soon as possible after the original midterm date. If a midterm exam is missed for a non-medical reason, the student will receive a grade of 0 for the missed examination.

Pollinator conservation management plan: Each student will research and write a conservation management plan for pollinators. This is an individual assignment meaning that group work is not permitted.

Late assignments will be penalized 10% per day and will no longer be accepted a week after the due date. If you cannot meet a course requirement, let Professor Raine ([nraine@uoguelph.ca](mailto:nraine@uoguelph.ca)) know as soon as possible, and preferably before the due date. Extensions will only be granted for medical reasons (documented by a Doctor’s note) or for documented compassionated reasons, at the discretion of the Instructor.

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.

Group project – oral presentation: Each group member will receive the same mark for the academic quality component of the group presentation, but will be evaluated individually for enunciation, pace, ability to convey scientific information and ability to answer questions. Presentations will be assessed by the course instructor and peer evaluation from the audience.

Attendance at oral presentations is mandatory. A 10% deduction from the group project oral presentation grade will be deducted if you do not attend.

Peer Evaluation - each student will complete a performance evaluation for themselves and for their project partners at the end of the semester in order to encourage equal participation of each group member, and to help ensure that each individual’s group project oral presentation mark is a realistic reflection of actual participation and effort. The Peer Evaluation is a quantitative assessment of each person’s abilities, participation and contribution to the group and to the process of constructing the research program schematic, group paper and presentation. Peer Evaluations must be honest and fair, and be accompanied by comments to justify the assessment of each individual. The Peer Evaluation will be used at the Instructor’s discretion to modify the grade (up to ±10% of the worth of the assignment) of any individual based on their level of contribution and participation in all aspects of the group project. A deduction of 10% will be applied to the group project oral presentation mark of any student that fails to submit evaluations for both themselves and their group members.

### Course Policy on Group Work:

Group work is required only for the group project, which includes group meetings, preparation of group contract and an oral presentation. All group members are expected to participate and contribute equally to the research and oral presentation. Group participation will be evaluated through group peer evaluation. In addition you will be required to peer evaluate presentations made by other groups. All group members are expected to behave professionally and ethically in all group activities. All members of the group are responsible for all content and aspects of the presentation, and may be held responsible for any instances of academic misconduct in group assignments.

### 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/).

**Additional Course Information**

None