

# Biol-307

## Urban ecology and biodiversity field course

Summer 2021

*\* This syllabus is tentative and was last updated on March 17, 2021\**

This new virtual field course is intended to provide students with an opportunity to explore core concepts in ecology and evolution with local biodiversity. Students will apply fundamental skills in experimental design, observation, sampling and data science. Our hope is that the course will foster a better understanding and appreciation of nature in students' own backyards, which they can carry with them in everyday life.

### Territorial acknowledgement

Queen's University is located on the traditional territories of the Anishinaabe and Haudenosaunee peoples. The course instructors, Regan and Chris, will be located on these lands for the majority of our time in this course. We are grateful to be able to live, learn, and especially to study the other life that lives on these lands, and acknowledge the role of Indigenous peoples in stewardship of this land. We also acknowledge that, due to the remote nature of the course, students may be located on the traditional territories of different Indigenous peoples and will invite them to share their acknowledgements during the course.

### Course team

Instructors: Regan Cross (PhD candidate) and Dr. Chris Eckert

Instructor contact: Email Regan at [cross.r@queensu.ca](mailto:cross.r@queensu.ca), or call her if urgent field-work issues arise at xxx. Email Dr. Eckert at [chris.eckert@queensu.ca](mailto:chris.eckert@queensu.ca).

**If you are having a health or safety emergency in the field, call 911.**

Office hours: N/A – email Regan to set up individual or group meetings to discuss any aspect of the course or the research project.

### Schedule

Week One: Synchronous instruction (May 10–14<sup>th</sup>)

Weeks 2–11: Complete research projects and species observations

Week 12: Synchronous instruction (August 23–27<sup>th</sup>)

Week	Content
1 (‘in-class’)	<ul style="list-style-type: none"><li>- View pre-recorded videos of field work demonstrations</li><li>- View pre-recorded “nature walk” videos</li><li>- Participate in Q &amp; A panel of field scientists discussing their work</li><li>- Attend guest lecture(s) from scientists studying urban ecology or geographic patterns of biodiversity</li><li>- Give individual presentations on a peer-reviewed research paper about some aspect of urban ecology or patterns of biodiversity</li><li>- In assigned small groups, brainstorm research questions that can be investigated using local fieldwork by all group members, or by using iNaturalist, GBIF, or other online databases of species records and geographic biodiversity patterns</li><li>- Meet with Regan and Chris to get feedback and approval of research plan</li></ul>

2	<ul style="list-style-type: none"> <li>- Submit finalized group research proposal</li> <li>- Peer edit and provide feedback on one other group's proposal</li> </ul>
2-15	<ul style="list-style-type: none"> <li>- Identify and submit to iNaturalist observations of at least 25 species (from at least two kingdoms and five families)</li> <li>- Execute research plan, analyze the data, prepare a presentation and written report</li> </ul>
16	<ul style="list-style-type: none"> <li>- Attend a day of group presentations on research projects</li> <li>- Attend a Q &amp; A panel discussion from Queen's EEB graduate students</li> <li>- Write individual lab report about group project (due two weeks later)</li> </ul>

### **Learning outcomes**

The main goals of this course are to expose students to field-based ecological research, to engage them with local nature, and to improve or exercise their scientific comprehension, communication, and study design skills. By the end of the course:

1. Students will apply concepts learned in core ecology and evolution courses to field biology and urban settings. Students will accomplish this through full participation in and engagement with all course activities.
2. Students will design, execute, present, and write up a complete scientific experiment.
3. Students will be able to explain fundamental concepts in geographic biodiversity patterns and urban ecology, as demonstrated through the explanation of background information in the group presentation and individual report.
4. Students will be able to question and critique the design, execution, presentation, and importance of field ecology studies. This will be demonstrated through their individual presentations of scientific papers, and their peer feedback on research proposals.
5. Students will develop skills in species identification, field data collection, using big online databases, group work, oral presentations, data analysis, and writing. Species identification skills will be demonstrated through iNaturalist observations, and the remaining skills will be demonstrated in the presentation and written report on the research project.
6. Students will be able to advocate for the importance of nature in urban spaces.

### **Learning hours**

Before course: 10 hours to prepare presentation about a research paper

Week One (May 10-14): 12 in-class hours

Research project (work happening from weeks 1-15): 65 hours

Species observations and submissions (weeks 2-15): 15 hours

Week Twelve (August 23-27): 3 in-class hours

Written report preparation: 15 hours

<b>Task</b>	<b>Hours</b>
Viewing pre-recorded field demonstration & natural history videos	6
Online panel discussions & guest lectures	3
Preparation for individual online presentation of a scientific paper	10
Attending student individual online presentations (15 students x 15 min)	4
Brainstorming & writing proposal for group research project	10
Peer feedback on one group proposal	1

iNaturalist submissions (finding, identification & uploading)	15
Execution of group project in their local area	34
Group data collation, management, visualization & analysis	10
Preparation for online group presentation of research results	10
Delivering & attending online group presentations (5 groups x 20 min)	2
Preparation of a formal manuscript from group research project	15
<b>TOTAL</b>	<b>120</b>

**Reading material:** Students will need to access the primary literature using the Queen’s proxy service (library.queensu.ca). Students will need to access digital or printed field guides for species identification, some of which are provided in OnQ (also see: <https://caroliniancanada.ca/enhi/online-resources>). Students will also need a camera (phone camera is sufficient).

### Assessment

#### *Brief grading scheme*

Item	Grade Percentage	Due Date
Participation - Peer feedback on proposals (5%) - Asking questions of panel & guest lecturers, and of peers after individual & group presentations (5%) - Group-evaluated involvement in group project (5%)	15%	Proposal feedback due Thurs, May 20 <sup>th</sup>
Individual presentation of scientific paper	15%	Tues, May 11 <sup>th</sup>
Group research proposal	10%	Mon, May 17 <sup>th</sup>
iNaturalist submissions (complete 25)	15%	Fri, Aug. 20 <sup>th</sup>
Group presentation of research project	20%	Mon, Aug. 23 <sup>rd</sup>
Individual report on research project	25%	Fri, Sep. 10 <sup>th</sup>

#### *Explanation of assessments*

1. Individual presentation of a research paper (15%, due May 11<sup>th</sup>): Having some background knowledge in the course material will help you to think up some project ideas for your group assignment, and prime you to be excited about the course before we even start. So, 15% of your grade is based on a presentation about a peer-reviewed scientific paper that you will prepare before the course begins on May 10<sup>th</sup>. Search the primary literature on urban ecology and/or biodiversity to find a cool paper that catches your interest. Read it over a few times, and feel free to email Megan if you are having trouble understanding something particular about the paper. Prepare a 12-minute talk that covers the paper’s background/rationale, question(s) and/or hypotheses/predictions, methods, statistics, results, and significance. Elaborate on what you found interesting about the paper, areas where you think the paper could have been improved, future work that you think could follow up the paper nicely, or cool other work you found by the authors. These presentations should get us all excited about the opportunities for field-based urban ecology or using species occurrence databases to analyze biodiversity patterns in nature. You will be graded on your grasp of the scientific paper, and thoroughness of presentation (background, design, methods, statistics, results, and significance), as well as clarity and aesthetics of the presentation.
2. Group research project proposal (10%, due May 17<sup>th</sup>): Developing a scientific study requires a lot of drafts, re-writes, and troubleshooting to make sure that the questions are

scientifically sound and driven by the current state of understanding in the literature, the methods will lead to results that distinguish between hypotheses, and the study is feasible within the timeframe and resources allowed. In the first week of class, you will have lots of time to work with your group and meet with Regan and Chris to discuss possible projects and refine details. On Monday, May 17<sup>th</sup>, you will submit a draft of your research proposal for feedback from some peers, Regan, and Chris. Your grade, worth 10%, will only be based on Regan and Chris's evaluations, but you will also receive the feedback from your peers to help improve your project. You will receive the feedback by Friday, May 21<sup>st</sup> so that you may proceed with your project throughout the summer.

3. iNaturalist species identifications (15%, due August 20<sup>th</sup>): Species identification can be difficult, but is an excellent skill to develop because it is essential in many ecology, conservation, and evolution-based careers. It also makes hikes and time spent outdoors so much more interesting! Plus, you can show off to your friends and family. Submitting time-stamped and GPS-coordinated species observations to online databases like iNaturalist helps scientists track species' distributions, phenology, abundances, and community compositions. This can aid with research on species-at-risk or species' responses to climate change. Other scientists will often confirm, refine, or make alternative suggestions about the identity of your observations. Travel around your current location by whatever means you like, and take pictures of organisms you see. Use field guides, online resources, or apps like Seek (by iNaturalist) or Merlin Bird ID to try and identify the organism to the species level. Upload these observations to inaturalist.org, and monitor feedback on the identification. If you can only get to genus-level (or higher), upload it anyway and see what others think. You will receive the full 15% of your grade if you upload **25** observations to at least genus-level (but try to get it to species) in **at least 2** kingdoms (e.g., plants and animals) and **at least 5** families. Regan and Chris will review your observations and provide guidance on any they think might not be quite right. You will not lose marks if your identification isn't quite right, as long as an informed attempt was clearly made.
4. Group presentation of research project (20%, due August 23<sup>rd</sup>): Synthesizing and sharing the outcomes from a scientific study is one of the most important parts of research. Being able to clearly articulate what you have done, what you found, and what it means for the field, are essential skills for any job in science. Thus, 20% of your grade will be a group presentation of your research project during the final week of the course in August. Throughout the summer, you will work with your group to execute the study and then collect, visualize, investigate, and analyze the data. You will draw conclusions from that data, and present everything (necessary background information driving your question, hypotheses and how your study design will address them, methods and statistics, results, and significance) to the class on August 23<sup>rd</sup> on Zoom. The talk will be 15-18 minutes long, with each group member speaking an approximately equal length of time, and 2-5 minutes for questions. All group members will receive the same grade, unless serious concerns are raised about a student's participation by the other group members.
5. Individual report on research project (25%, due September 10<sup>th</sup>): Communicating findings in a written format is often the capstone on a scientific study, with a full manuscript sent off for publication in a journal. Similarly, the final project for this course will be a written report. The report will be written individually, and while it will resemble the reports of your other group members in terms of content, it must be written entirely in your own words. This will reflect your understanding and application of what you've learned throughout the course and the research project. Reports should resemble scientific papers that might be

submitted to a journal for publication. Feel free to model your report after any prominent journal in the field (e.g., Ecology, Evolution, Ecology Letters.... **not** Science or Nature because they follow a non-traditional format). Include an abstract, introduction, methods, results, figures / tables, discussion, and references sections.

6. Participation (15%): The way to get the most out of this course is to fully engage with all of the activities and ask a ton of questions of everyone around you. Thus, 15% of your grade is based on participation.
  - a. Asking questions of instructors, guest lecturers, panelists, or peers after presentations (5%).
  - b. Peer feedback on the research proposals of each other group (5%, due May 20<sup>th</sup>).
  - c. Involvement in group project, evaluated by peers in group (5%).

### **Safety concerns**

All outdoor activities associated with this course will take place in students' neighbourhoods and, therefore, will not involve any risks in addition to those incurred in daily life. Students are advised to research the prevalence of ticks and tick-borne diseases in their areas before walking through any tall grass in local parks, and dress accordingly.

All course content will be delivered remotely using OnQ and Zoom, except for when students are collecting data or making iNaturalist observations, in which case they will be alone and are encouraged to wear masks if people are around. Therefore, there is no added risk of exposure to COVID-19.

### **Late policy**

Presentations (both individual and group) must be delivered on the due dates, unless in extreme cases. If students require extensions on the species observations submissions or final written report, please contact Regan to select a new due date.

### **Grading method**

All assignments will receive letter grades, which will be translated into numerical equivalents for calculating the grade average using the Faculty of Arts and Science Letter Grade Input Scheme. The scale will be:

### Arts & Science Letter Grade Input Scheme

Assignment mark	Numerical value for calculation of final mark
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

#### Queen's Official Grade Conversion Scale

Grade	Numerical Range (Historical)	Grade Point Equivalent
A+	90-100	4.3
A	85-89	4.0
A-	80-84	3.7
B+	77-79	3.3
B	73-76	3.0
B-	70-72	2.7
C+	67-69	2.3
C	63-66	2.0
C-	60-62	1.7
D+	57-59	1.3
D	53-56	1.0
D-	50-52	0.7
F	49 and below	0.0

#### Academic Integrity and Queen's Code of Conduct

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity (see <https://www.queensu.ca/artsci/students-at-queens/academic-integrity>).

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on

academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course or a requirement to withdraw from the university.

If you are unsure of what constitutes a breach of academic integrity, please see the detailed provided on the OnQ site for this course or ask the course instructor.

### **Accommodation Policy and Conflicts**

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (<https://biology.queensu.ca/academics/undergraduate/prepare-yourself/>). In general, the earlier a course coordinator is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Queen's general policy on extenuating circumstances is here:

<https://www.queensu.ca/artsci/undergradstudents/academic-consideration-for-students>

Short-term illnesses or other emergencies can be documented by several different types of "supporting documentation" as described here: <https://www.queensu.ca/artsci/undergradstudents/academicconsideration-for-students/definitions#supporting-documentation>

For short-term illnesses that don't require medical attention you will not be expected to get documentation from a physician or student health (you should be resting in bed, not lined up at a clinic), but you will need to fill out and submit to the instructor an attestation form (see supporting documentation above).

If you have questions, feel free to contact the Academic Consideration Counsellor in the Faculty Office at: [asc.consideration@queensu.ca](mailto:asc.consideration@queensu.ca) or 613-533-6000, ext. 75413.

### **Accommodation of Disabilities**

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at:

<https://www.queensu.ca/studentwellness/accessibility-services>

Students are also encouraged to contact the course instructor(s) as soon as possible in order to discuss accommodations/ modifications of course expectations (as necessary).

### **Copyright**

This and other material associated with this course is designed for use as part of BIOL 307 Remote Urban Ecology and Biodiversity Field Course at Queen's University and is the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

### **Support for wellbeing**

We understand that students' mental and/or physical health and wellbeing may be challenged during this course, particularly as it takes place during the COVID-19 pandemic, and we are here to support you. Please feel free to reach out to Regan or Chris for any form of support or course modifications at any time.

The following resources are available to Queen's students:

*Queen's Student Wellness Services*

Student Wellness Services (SWS) supports the personal, academic, and social health development of students at Queen's University by providing a range of programs and services.

<https://www.queensu.ca/studentwellness/>

*Queen's Student Wellness Services, Mental Health Services*

Offering one-on-one appointments with our mental health professionals, groups, events and trainings, plus an online self-directed tool called Therapy Assistance Online (TAO).

<https://www.queensu.ca/studentwellness/mental-health>

*Empower Me*

Call: 1-833-628-5589 (see website for international toll-free numbers) 24/7, 365 days per year for Queen's students.

Connect immediately and confidentially with qualified counsellors, consultants, and life coaches for various areas of expertise. Empower Me can be used for crisis situations or scheduled sessions.

<https://www.queensu.ca/studentwellness/empower-me>

*Good2Talk*

Any post-secondary student in Ontario can connect with qualified counsellors 24-hours a day, 7 days a week at 1-866-925-5454

Or, text: GOOD2TALKON to 686868 to get started and be connected to a trained crisis responder who is there to listen and support you through the immediate issues you are facing

*Addiction & Mental Health Services (KFL&A)*

Anyone living in the Kingston area can call the crisis line 24-hours a day, 7 days a week 1-866-616-6005 or 613-544-4229

They have mobile crisis support that can come to you if needed

*Telehealth Ontario*

Anyone living in Ontario can call a registered nurse to get medical advice or information 24-hours a day, 7 days a week at 1-866-797-0000