

UNIVERSITY OF CALGARY  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

1. Course: **Biology 591 INSECT BIODIVERSITY**
- Lecture Sections: L01 & B01 Biogeosciences Institute August 10-19 Summer 2016
- Instructor(s):** Dr. R.W. Longair BI 042 220-7387 longair@ucalgary.ca

**On D2L: BIOL 591 L01 - (SUMMER 2016) – INSECT BIODIVERSITY (S2016BIOL591L01)**  
Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITES: Biology 243 and 313 and Consent of the Department**  
See section 3.5.C in the Faculty of Science section of the online Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html> )
3. **GRADING:** The University policy on grading and related matters is described in “Academic Regulations, sections F.1 and F.2” of the online University Calendar (<http://www.ucalgary.ca/pubs/calendar/current/f-1.html> and <http://www.ucalgary.ca/pubs/calendar/current/f-2.html>) In determining the overall grade in the course the following weights will be used:

<b>Taxonomy and Morphology Quiz</b>	<b>12%</b>
<b>Insect Family Exercise</b>	<b>8%</b>
<b>Insect Collection</b>	<b>45%</b>
<b>Diversity Project</b>	<b>30%</b>
<b>Participation</b>	<b>5%</b>

There will NOT be a final examination scheduled by the Registrar.

A passing grade is required for both the Insect Collection and Diversity Project.

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student’s percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade. An F grade will result if the student does not pass the Insect Collection and Diversity Project components.

4. **Missed Components of Term Work.** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html> It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>
5. Dates and times of class exercises held outside of class hours (field trips, MT, etc.)

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **EXAMINATION POLICY:** No electronic or written aids (e.g. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>."
7. “In this course, the quality of the student’s writing in laboratory reports will be a factor in the evaluation of those reports. See also <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>

8. **STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** See <http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html> and also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>

9. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

(a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties.

(b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).

(c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at [http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf).

Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-3140.

(d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.

(f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca)  
SU Faculty Rep. Phone: 403 220-3913 Email: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca);  
<http://ucalgary.ca/provost/students/ombuds>

(g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

Department Approval: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_

Associate Dean's Approval for  
Out of regular class-time activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_  
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TEXT: Required:

A Field Guide to the Insects of America North of Mexico. D.J. Borror & R.E. White. Latest Edition; Peterson Field Guide Series, Houghton Mifflin  
(or equivalent - please contact instructor if you wish to use another guide)

Other supplies:

See attached list

Grading Scale

A	85
A-	80
B+	75
B	70
B-	65
C+	60
C	55
C-	50
D+	45
D	40
F	<40

**COURSE OBJECTIVE** Examine the diversity of insects and related terrestrial arthropod groups; learn basic identification, techniques for sampling different taxa, and the significance of insects to studies of biodiversity.

**LOCATION OF COURSE** See <http://bgs.ucalgary.ca/facilities/barriermap> for directions. Barrier Lake Field Station phone is (403) 220-5355 or (403) 673-3662. Cell phones tend to function poorly, if at all, at the station.

**WHEN TO ARRIVE** Wednesday, 10 August. Lunch that day is included as part of your station fee. You will be able to check in immediately. **You should arrange for your own transportation to the station. In the event that you cannot do so, please let me know.**

**WHEN TO LEAVE** Friday, 19 August. Breakfast that day is included. You should try and have your things packed in the morning. You are expected to help pack up course material and clean up the lab on the last morning as well - **if you do not, this will be reflected in your grade.**

### **TUITION, TRANSPORTATION AND FIELD STATION FEES**

The course tuition is paid directly to the University of Calgary. There is a supplemental fee of \$660.85 which covers accommodation and meals at the field station, vehicles/transportation in the vicinity of the station, some equipment (alcohol, pins, labels, etc.) and other items. **You pay this amount with your tuition and fees to the University.**

### **FACILITIES**

Rooms - are double occupancy. Bedding and towels are NOT supplied. Each dormitory wing has a central washroom with showers. Since dormitories may have day sleepers (i.e. researchers who work at night) it is important that these areas are quiet both day and night. If you wish to talk, do it in the main living area. No pets are allowed at the station.

Meals - When we eat at the station, these are served in the lodge, cafeteria style, at:

0800 (8:00 a.m.)

1200 (12:00 p.m.)

1730 (5:30 p.m.)

These times may be changed slightly to accommodate other courses. We will be out in the field for extended periods on most days. On these days or when we're not sure where we'll be, you will make your own sandwich/wrap lunch after breakfast. We may eat these in the field or outside at the station if we are in the vicinity. **This means on almost all days except the first day and Sunday we will make a bag lunch although we will sometimes eat it at the station.** Lunch on the first day and Sunday will be a hot meal.

### **WEATHER**

The weather is very changeable and it can range from cold to warm (it hardly ever gets *really* hot here). **Note: It can snow any month of the year so prepare yourself accordingly and there are no nearby stores so bring what you need when you come.** See the additional information material included for more details.

## WHAT THE COURSE IS ABOUT (in a few more words)

The intent of the course is to introduce you to the diversity of insects in such a way that you have some understanding of the significance of this group in ecological and evolutionary terms and that you are able to examine these organisms in a field setting where, to be honest, some of us think the most enjoyable part of biology resides.

You will be introduced to the major orders of insects and by the end of the course you should be able to recognize most orders by sight and identify those you don't recognize through the use of identification keys. You will also be able to identify some of the more common families of insects using keys. In order to accomplish this, you will be required to make an **insect collection** of 100 specimens, **properly prepared and labeled and identified to the level requested**. This will also give you an idea of how much time it takes to sort, prepare and identify material which may be used in biodiversity and other types of studies involving quantities of specimens. Material in your collection must be collected and identified during the course.

You will also produce a **short summary paper (1-2 pages) on a particular group of insects**. This will be turned in early in the course and will serve as an introduction to the natural history and other details of one type of insect. Don't do this ahead of time - you will be assigned an insect.

There will be a **quiz** on material from the lectures and "text" after the first two days to ensure you have a basic working knowledge for identification.

You will be introduced to techniques (trap types, trap placement, assumptions about trap effectiveness) involved in sampling insects (primarily terrestrial species) and how one should approach sampling for quantitative comparisons of material captured. This will also be an introduction to including insects as part of a biodiversity survey. This is a group which is often neglected when people talk about "biodiversity".

You will be introduced to examining diversity in samples as part of a brief **diversity project**. Groups of students will be assigned (or choose) a particular insect taxon or a question dealing with sampling insect diversity for which they will examine differences in diversity at different times, sites, etc. You will then produce a written report of the group findings with appropriate background information (gleaned from material available at the station and online). This will come in the last half of the course.

You are required to keep a **field notebook** during the course. This is simply a record of weather conditions, collecting localities, significant observations, etc. over the period we are working. Sketches of insects you see may be helpful, but are not required. You should keep notes in pencil and the notebook should be bound (or at least not loose pages or those which easily detach), and small enough to carry with you easily. This will not be graded but will be part of the participation grade.

The course schedule included tries to give you an idea of when we will do some things, but you should use it as a very rough guideline. We will shuffle things around as the weather makes it appropriate and as things appear serendipitously (as they often do).

## WHAT TO BRING

Equipment which is required for the course will be supplied (e.g. traps, nets, alcohol, pins, etc.). You will need to bring personal effects, field clothing, field guides and note-taking materials. Bring what you want - there are no nearby stores, and no guarantee anyone will be going to any of the more distant stores. \* Bedding and towels are not provided for UofC courses

\*Bedding (own linen (2 sheets) or sleeping bag)

\*Towel(s), etc. - 1-2 and wash cloth

Toothbrush and toothpaste

Laundry detergent and loonies (for washing machine and dryer)

Shoes/sandals (indoor for use in lab and dorm - leave muddy boots at entrance way)

Shower shoes (optional)

Boots or shoes for walking/hiking

Waterproof boots (if you already own a pair of hipwaders these may be useful at certain sites) – note that there are a number of pairs of rubber boots at the station.

Socks (several pairs)

Pants (including some for rough outside use)

Shirts/blouses (long and short-sleeved)

Sweater(s) (woolen or fleece is best) - \*several layers of clothing are more versatile than one heavy coat\*

Jacket (windproof)

Hat (for sun)

Hat/touque (for cold)

Mitts/gloves – just in case

Rain gear: jacket, hat, trousers if you have them - we go out in all weather but you may not need these

Sun screen/block

Insect repellent (if you go with a product with DEET, get <30% DEET; remember, a really high % of DEET may dissolve some plastic and pencil paint!)

Sun glasses

Flashlight

Batteries

Pen, pencil, eraser, ruler, calculator

\*\*Small note book for field notebook and paper for assignments (if hand written)

Flash drive/USB key - see microcomputer use guidelines included

Clipboard or 3-ring binder – flat surface to write on in field

Small stapler (optional)

Small daypack/packsack to carry extra clothing, lunch, notebook, field guide, etc. in field

Water bottle

Binoculars (optional)

Camera (optional)

Alarm clock

Bathing suit (glacier-fed lakes!)

Reusable Lunch bag

Hand lens or some other magnifier

Garden trowel (optional)

Belt knife (with strong blade) is useful for prying bark off or poking around in dead logs and other things (optional)

\*\*Laptop computer (don't buy it for the course!)\*\* - completely optional but handy; all buildings have wireless access; there are also computers at the station

## COURSE SCHEDULE (TENTATIVE)

Each day will usually involve starting course work after breakfast (about 9) and working until dinner (with a break for lunch) and then continuing afterward in the lab in the evening. Days and times of exercises are tentative and dependent on weather and other factors. If the weather is nice and warm, we may postpone a lecture and go outside. We will spend most days and evenings in the first few days working on setting up some traps and doing general collecting, preparation and identification for your collections. Later on, evenings in particular will be spent sorting, preparing and identifying specimens from traps for use in the diversity projects.

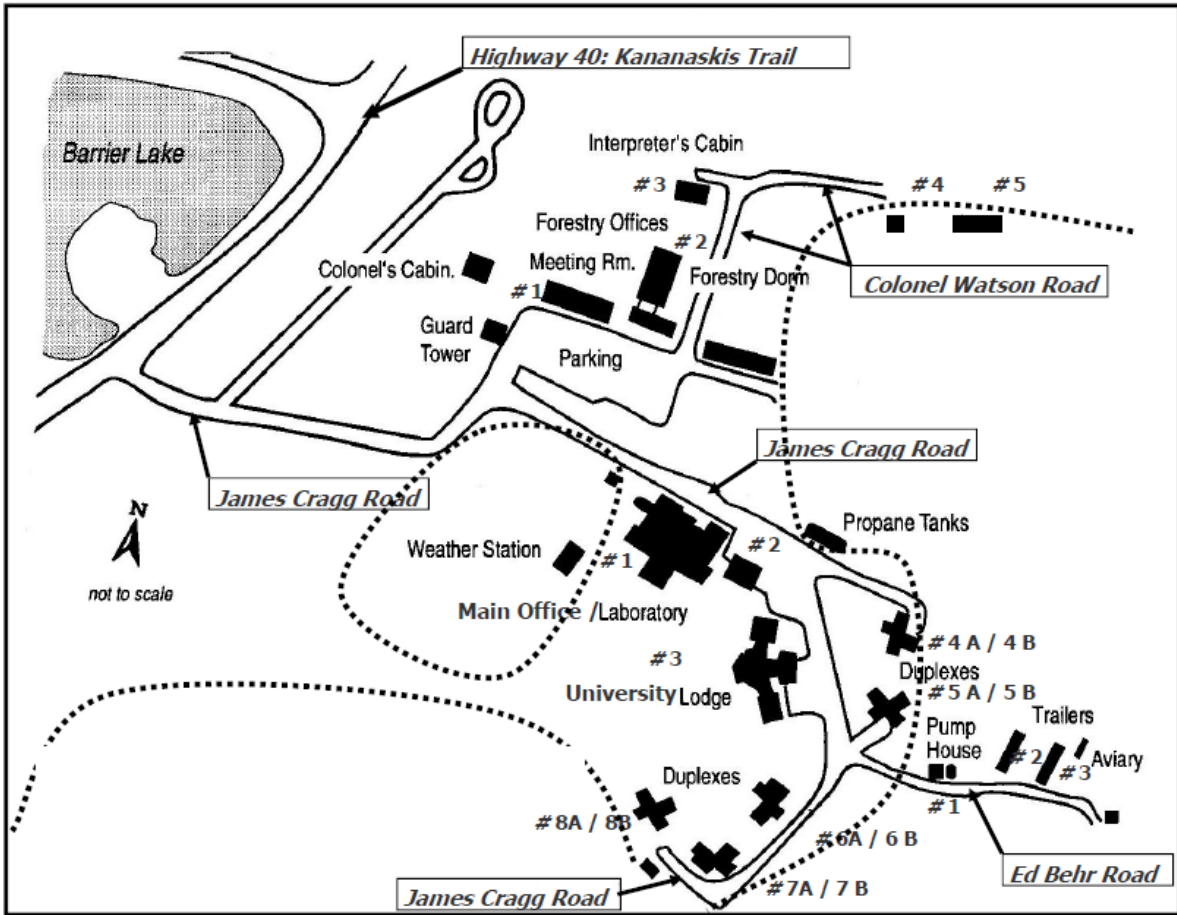
10 August	Wednesday	Day	Arrive and settle in. <b>Class meeting 1300.</b> Introduction to Field Station. Introduction to Insect Diversity. Collecting and preparing insects. Pick an insect for Family Assignment
		Evening	Work on Family Assignment and Morphology/Taxonomy
11 August	Thursday	Day	Malaise/pitfall/pan trap setup; collecting
		Evening	<b>Quiz on insect morphology and taxonomy</b>
12 August	Friday	Day	Biodiversity sampling protocol Insect databases (Alberta, Canada & beyond); collecting
		Evening	Collection prep and ID; <b>Family assignment due</b> Project introduction- ID/Diversity sample analysis
13 August	Saturday	Day	Day trip; Hand collecting - logs, bark, leaves, etc; Collecting
		Evening	Collection prep and ID
14 August	Sunday	Day	Day trip - aquatic insects?
		Evening	<b>Project proposal due</b> Collection prep and ID
15 August	Monday	Day	Day trip
		Evening	Collection prep and ID
16 August	Tuesday	Day	Diversity sampling; Collection prep and ID
		Evening	Diversity sample analysis <b>Collection due</b>
17 August	Wednesday	Day	Diversity sampling
		Evening	Sorting, IDing diversity samples
18 August	Thursday	Day	Work on diversity report
		Evening	<b>Diversity report due</b> /presentations
19 August	Friday		Clean up ( <b>required</b> ) Depart around lunch

**BARRIER LAKE FIELD STATION**  
**Student Information for Courses**

**Upon arrival at the Field Station there will be a presentation on Field Station procedure by a BGS staff member.**

1. For University of Calgary courses, please bring your own bedding (2 sheets) or sleeping bag and towels. BGS will provide pillow/pillow cases.
2. There is a pay phone in the Main Lodge for visitors that accepts phone cards or c/c only. **There is no cell service at the field station.**
3. E-mail access is available with a combination of wireless/wired connections. Wireless can be accessed in most buildings using the same passwords used on main campus. There are numerous computers with wired connection in the lab building computer room. **No downloading or streaming of videos/movies** on wireless as this will reduce wireless availability for everyone else.
4. Pets are not allowed at the Field Station.
5. **Outside campfires are not permitted.**
6. Please park your personal vehicle in the main parking lot (see map on the next page).
7. Hiking boots and dirty, wet footwear are not to be worn in the Lodge, Lab or duplexes.
8. Meals are served in the Main Lodge. Please contact your course instructor if you have any food allergies, are a vegetarian or have medical restrictions that we should be aware of. The Main Lodge is **NUT FREE** (including Peanuts).
9. Please use the recycling bins for your empty beverage containers. There is zero tolerance for littering.
10. A laundry room is available in the North Shop. Washing machines are \$2.00/load and dryers are \$1.00/load. Please bring your own laundry detergent. The laundry machines accept quarters and loonies (\$1 coins).
11. Please do not store any food in the sleeping accommodations. Appropriate cupboard space is available in both lodges.
12. Barrier Lake is a multi-use field station with numerous users groups using the facility. Please respect other groups and staff the live on-site. Quiet time is between 11pm and 7am.
13. All fees are to be paid through the Registrar's Office.





Mailing Address: Biogeoscience Institute, BS 186  
 University of Calgary  
 2500 University Dr. NW  
 Calgary, AB. T2N 1N4  
 Phone: (403) 673-3662 or (403) 220-5355  
 Fax: (403) 673-3671

## **BIOGEOSCIENCE INSTITUTE, BARRIER LAKE FIELD STATION SAFETY IN THE ALPINE ENVIRONMENT**

**Special conditions exist when working and studying in an alpine environment and certain precautions must be taken to ensure your safety. You are responsible for your own safety and for the safety of those around you. You may be working in a remote area where emergency services are not readily available so it is important that everyone acts in a safe and responsible manner.**

- Weather conditions are very unpredictable in the mountains. Each time you travel in the mountains, you should take rain/wind gear, hat/toque, extra sweater/fleece, mitts/gloves. Snow can occur any time during the year and sudden afternoon thunderstorms are very common during hot, sunny days. If you are above tree line and a thunderstorm is approaching, immediately head for lower ground and protection.
- Sturdy footwear (e.g. hiking boots) should be worn when traveling in mountainous terrain.
- Sunlight can be very intense at the higher elevations. Take a hat, sunglasses and sun block.
- Stay on the maintained trails as much as possible. Avoid taking short cuts on switchback trails as this contributes to the erosion of the area. Be aware of where you are and how you got there by making mental notes of landmarks. If you get separated from your group, you may have to find your own way out. If you are working on your own, make sure someone in the group knows where you are and how long you will be there.
- It is always easier to scramble up rocks than down, so be aware of your own limitations. Don't choose a study site that puts you in unsafe conditions. Shortcuts generally take twice as long as staying on the trail, as you usually end up bushwacking.
- It is very easy to become dehydrated while working in the alpine environment. Drink fluids often and take at least 1 litre of fluids with you.
- Pack a good lunch in the morning and snack frequently during the day. It is important to keep your energy levels high to prevent twisted ankles or falls on the hike out at the end of the day.
- Kananaskis Country is the home for black and grizzly bears, cougars, wolves, moose, elk and other large mammals. It is important to respect them and not attract them by leaving garbage, foodstuff outside. If you see evidence that bears are in the area that you want to work in, leave the area and choose another site. If you are working in an area, make "human noise" like singing, talking etc. to let any wildlife know that you are there and they will generally avoid you. More information on "wildlife encounters" will be presented to you on your arrival at the Field Station.

**Inform your instructor prior to your field trip of any condition which may require emergency medical attention such as diabetes, asthma, insect sting allergies. You are responsible for determining whether you should participate in any activity.**