Queen's University
Ontario Universities Program in Field Biology

Course Title:	**Desert Ecology & Evolution**
Instructor(s):	Dr. Christopher Eckert, Queen's University (chris.eckert@queensu.ca) Chloë Dean-Moore, Queen's University (16cedm@queensu.ca) Graydon Gillies, Queen's University (g.gillies@queensu.ca)
Dates:	28 April –12 May 2024
Location:	Southern Arizona and California USA
Cost:	• $1500 ($350 deposit + $1150 paid later, see below) which covers all costs except airfare (~$500) and food (~$150). • Students arrange their own air travel as long as they make it to Phoenix Arizona (PHX) by Noon, Sunday 28 April. Food will be purchased at several resupply stops throughout the course. • To confirm your enrolment, we must receive the $1150 balance (cash or cheque made out to Queen's University) by 24 March 2024. Failure to pay the balance on time will result in your losing your spot to someone from the waiting list. • To cancel and get your balance back, you must inform us in writing by 1 April 2024. This gives sufficient time to find a replacement for you. If we cannot find a replacement, your deposit is forfeit. • If you cancel after 1 April 2024, we reserve the option of keeping your deposit + balance, but will do so only if we have no alternative. We will try to find a replacement, and if we do, you'll get your money back. You are welcome to find a replacement for yourself, and then we're all happy.
Prerequisites:	Completed 2nd year in a biology program. Introductory ecology, evolution and statistics is helpful but not essential. Valid passport (and VISA if necessary) for travel to the USA. Sense of humour and a love of the outdoors.
Enrolment*:	18(5)
Description:	• This course explores the ecology & evolution of plants and animals in the terrific deserts and arid lands of the southwestern USA. Through class exercises and group research projects, we will investigate how geological, climatic, and biotic factors interact to influence the abundance, distribution, life histories, reproductive strategies, and behaviour of desert organisms. • We will meet Los Vegas (Nevada, LAS) at 2 pm, Sunday 28 April and will travel from site to site in rented minivans, spending 14 days visiting, amongst other sites, Joshua Tree National Park, Organ Pipe Cactus National Monument , Saguaro National Park and Chiricahua National Monument. • All nights are spent in the field, camping in tents. We will supply tents but each student will need the use of use of a warm sleeping bag, a sleeping pad and eating tools. Meals will usually be camp-style, with students participating in preparation and clean-up. We will supply stoves, pots and pans. When we are in areas with no ready water supply we rely on packed water, so there will be no luxury water-use (e.g. showering or hair washing). This will require flexibility with respect to personal hygiene.
Evaluation:	(1) Trailside seminar in the field (20% of your total mark) (2) Formal write-up of an independent field research project (40%) (3) Field notebook (15%) (4) Practical hands-on exam conducted in the field (10%) (5) Participation (15%)

*For your enrolment numbers please show the total enrolment with your reserved seats in parentheses; e.g. 12(4) would indicate total enrolment is 12 with 4 seats reserved for the home university.

What to Expect

(a) Daily timeline	It is most comfortable to work in desert habitat during the early morning and late afternoon/evening, so we are typically up, fed and ready to roll before sunrise, and are hiking and doing field studies during the cooler morning hours. We return to camp at ~11am for lunch and a brief siesta out of the noon sun, and then return to the field ~3pm for afternoon and evening activities until sundown. We return to camp ~8pm for dinner, and students usually socialize until they choose to retire to their tents. The instructors will lead night hikes regularly but these are optional.
(b) Work habitat & physical exertion	To experience the biological diversity of desert habitats, we hike extensively at each of the sites we visit. Students can expect to hike 10–15 km per day through rugged terrain. Everyone carries a backpack with field equipment, changes of clothing and at least 2-4 L of water. Sturdy footwear and decent physical fitness are essential.
(c) Common activities	None of the activities students are required to engage in are risky, but the habitat that we will be working and living in poses challenges described below.
(d) Weather, dehydration & biting insects	The southwestern deserts are renowned for temperature extremes. Some mornings and evenings it may be cold (5–10°C) and windy, whereas afternoons are usually hot and still (30–40°C). Dressing for the weather, shielding skin from the sun and staying well hydrated are extremely important. Although we will observe many wasps, bees, spiders and ants, insects who make a living by biting humans are mercifully absent from most desert habitats.
(e) Toxic/poisonous, wildlife/plants	Desert plants aggressively protect themselves with spines and thorns so that students quickly learn which ones to avoid. Scorpions are abundant but usually shy and easily avoided by zipping up your tent, keeping shoes inside for the night and not walking around in bare feet. We do encounter rattlesnakes but these animals are not aggressive and we will discuss how to avoid and treat snakebites.
(f) Sleeping, washroom & laundry facilities	We sleep in tents and have access to washroom facilities in state and national parks. These facilities range from modern and clean to charmingly rustic. Students must bring their own sleeping bags and mats. They can also bring a tent but we will have tents for everyone. Because we are working and living in very arid habitats, showers and other ablutions involving profligate use of water will be very infrequent. There will be little or no opportunity to do laundry.
(g) Meal plans & food allergies	All meals are cooked at campsites on safe, efficient alcohol stoves. We provide stoves and pots, while each student should bring their own cup, dish and utensils. Groups of 4 students that share dietary restrictions and preferences will buy food together, share a camp stove and pots and cook together. We can accommodate all food allergies and dietary restrictions.
(h) Non-academic responsibilities	Students will cooperate in setting up and taking down the field camp as we move from site to site. They will need to keep their camp stove and pot clean and help maintain and keep track of research equipment.
(i) Degree of isolation	Cell service is unlikely at each of our four main study sites, so we will have a satellite phone for emergency contact. We are within 911 coverage in the case of emergencies. Professional medical services are available in communities within a 30–60 minute drive from the main field sites. While travelling from site to site (i.e. every few days), we will make stops for food and other supplies required by individual students as well as opportunities to check email and messages.
(j) Alcohol & drugs	Students are strongly encouraged to behave responsibly and must abide by the liquor and drug laws in the states of Nevada, California and Arizona. In all states, the legal drinking age is 21 and alcohol may be legally consumed only on designated campsites. Students are expected to not be under the influence of any non-prescription substances during course work hours. Work missed due to hangovers cannot be made up.
(k) Vaccinations & insurances	All students will require supplementary insurance coverage for medical expenses in the USA and will be asked to provide details of their coverage to the course instructors before departure. Students must bring their health care cards and proof of insurance on the trip. Up-to-date tetanus and COVID-19 vaccination required.
(l) Social situations	Students will spend 2 weeks together in close quarters and working on group field exercises and research projects. There will be plenty of opportunity for socializing during siestas and in the evening. Mutual respect and tolerance are essential components of participation in this course. Harassment of, or violence towards, other students or users of the facilities and areas we visit will not be tolerated. Any incidents should be immediately reported to either of your instructors. Appropriate actions will be determined by your instructors in consultation with Queen's University Emergency Report Centre to ensure the safety and security of all present.
(m) Final comments	The goal of this course is full immersion in the wonderful deserts of the southwest. By hiking, cooking, eating, sleeping and generally hanging out in the desert day and night you can experience the many facets of its beauty and fascinating biological diversity. In the past students have really enjoyed the course and particularly appreciated the opportunity to develop, execute and write-up their own group research projects.