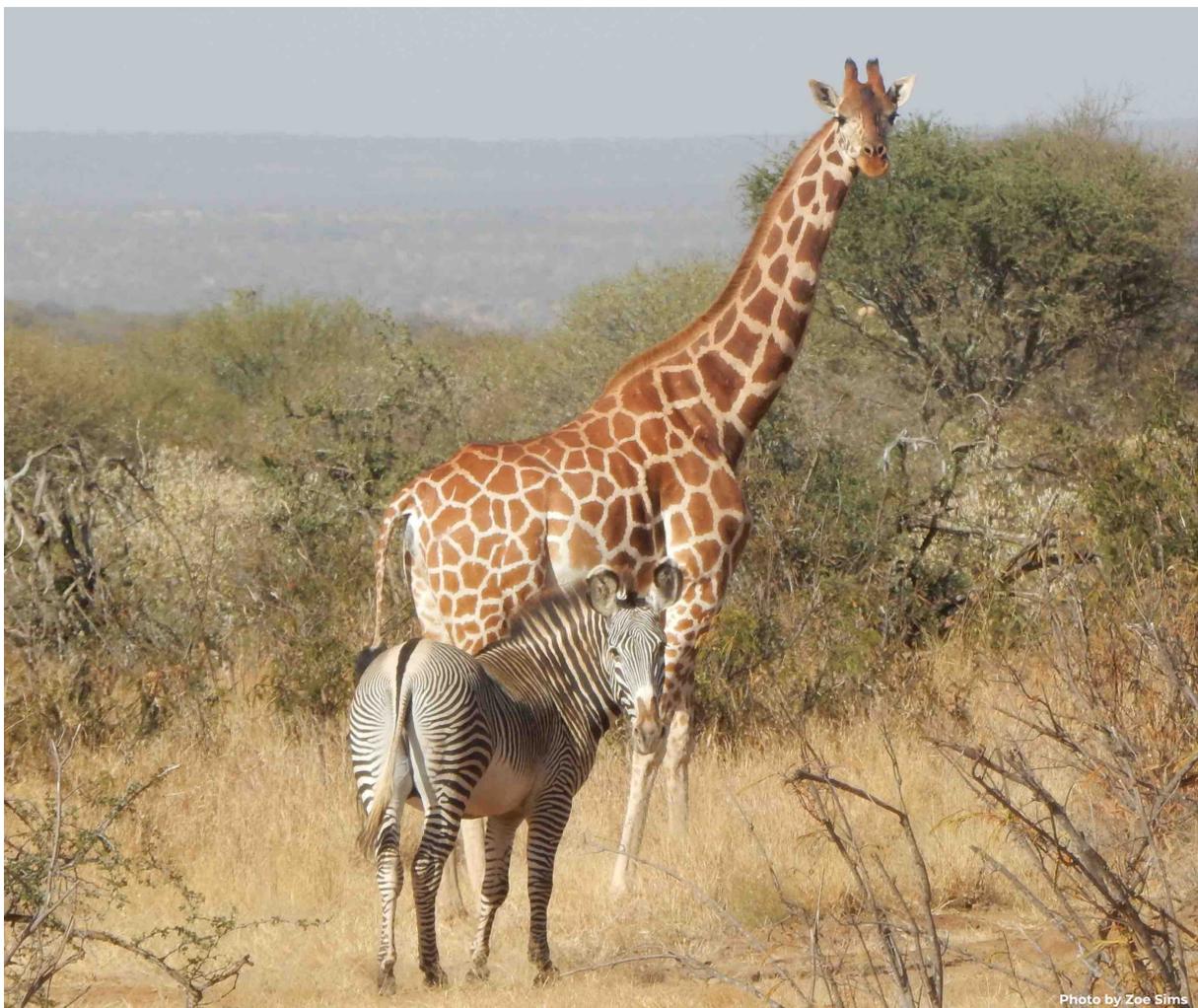


## Course Information Document

# Ecology and Conservation of African Ecosystems



All participants should please read immediately on receipt

## COURSE SUMMARY

### Course Code

BIOL4288

### Course Title

Ecology and Conservation of African Ecosystems L4 option (with field course)

### Academic Session

2023-24

### Short Description of the Course

This option will consider the principles of ecology of African ecosystems, including the practical issues of conservation, management and human-wildlife conflicts. The field-trip will also provide faunistic exercises and training in experimental design and analyses/presentation of ecological data.

### Teaching staff

Dr Davide Dominoni (BOHVM) is a Lecturer in Urban Ecology. He also coordinates another L4 Zoology course option, Behavioural Ecology. He has long-standing expertise in behavioural field ecology, and all his research involves the observation of animals in their natural wild environment.

Dr Oskar Brattström (BOHVM) is a Lecturer in Animal Biology. His main research interest is evolutionary biology, with a focus on speciation patterns and bias in evolutionary processes, topics he has investigated using African butterflies as a model system. He first visited Nigeria in 2005, and have since returned to the continent over 20 times also working in Ghana, Kenya, Liberia, Madagascar, South Africa, and Uganda. His favourite African animal is without doubt the Tree pangolin (*Phataginus tricuspis*)

### Requirements of Entry

Only available to final-year School of Life Sciences students in Degree Group A (Animal Biology group) programme.

### Associated Programmes

This course is offered by the Zoology programme.

### Available to visiting students

No

### Available to Erasmus students

No

Typically offered

Semester 1

## Timetable

This option is assigned to semester 1. As an optional course, lectures in Glasgow before the field trip will take place on Fridays. Normally, we will have four 2-hour in-class lectures during the four weeks preceding the field trip. We will also have a single 2-hour information session before the trip, also on a Friday.

The field trip will last for about two weeks (28<sup>th</sup> October – 14<sup>th</sup> November). No more lectures are scheduled after the return to Glasgow, although one-to-one meetings between students and staff are expected to discuss their individual reports and give feedback.

## Course Aims

The course aims to enable students to develop an understanding of the structure, characteristic biota, ecology and functioning of tropical African ecosystems, and with an appreciation of how this knowledge is key to achieving sustainable conservation and management of these ecosystems. Specifically, the themes are:

- The mechanisms through which African ecosystems operate;
- The role of the major plant and animal groups in these systems and how they interact with the physical, chemical and human environment;
- How knowledge of these principles is applied to the practical issues of conservation, management of protected areas, pollution assessment and human-wildlife conflicts.

## Intended Learning Outcomes of Course

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

- Produce sustained arguments on how the complexity and geological age of African ecosystems result in highly diverse ecological communities;
- Recognize the potential threats to African ecosystems and associated natural resources;
- Recognize the challenges involved in the sustainable management of African ecosystems, including the effectiveness of protected areas;
- Critically evaluate which method for collecting data on biodiversity, population density and animal behaviour is more efficient based on the research question and type of species;
- Learn to interpret and evaluate papers from the primary scientific literature;

- Apply quantitative and experimental design skills in the context of field studies on African ecosystems;
- Demonstrate a wide range of practical skills and abilities, survey, planning and time management, writing and presentation;
- Troubleshoot challenges related to teamwork during experimental design and data collection.

### Minimum Requirements for Award of Credits

Students must submit at least 75% by weight of the components (including examinations) of the course's summative assessment.

### Description of Summative Assessment

The course will be assessed by a 2-hour examination (50%) in May, and an in-course assessment consisting of an individually written project report (35 %) and a reflective statement (15%), to be submitted within 3 weeks of returning from the field course. The exact hand in dates are available on Moodle.

### Are reassessment opportunities normally available for all summative assessments in this course

Not applicable for Honours courses

### Formative Assessment and Feedback

There will be two in-course assessments and one final exam.

The first in-course assessment (project report) will follow a mini-project that the students will conduct in three groups of four students during their time in the field at Mpala in Kenya. Each group will design a separate project with the help of the supervisors and a local field assistant. For the data collection, groups will shift between the three projects to enable all students to learn as many sampling techniques as possible, but the team who initially designed each the project will be responsible for producing a method description for the other groups to follow. There will be regular debriefing sessions during the time in the field and at these occasions the performance of the teams and the class as a whole will be discussed with the students, and staff will provide feedback. Where appropriate individual feedback will also be given in private. The students will individually prepare a mini-paper project report (5 pages max, 35% project output for summative assessment).

The second in-course assessment will be a reflective statement in the form of an annotated field-diary (15 %) on the experience from all elements of the fieldwork.

Students will need to submit the reports and reflective statements within 3 weeks of returning from the field course, and thus before the Christmas break. These will be assessed by the staff, and grades returned within three weeks of the deadline via Moodle. When appropriate, further individual feedback will be given by the staff in private.

All the above feedback will support students' preparation for the end-of-course examination.

### Examination Diet

December for in-course assessment, May for final exam

### Total Exam Duration

60 minutes for the final exam.

### TEACHING STAFF

Name	Institute	Building	Telephone	Email address
Dr Davide Dominoni (Course Coordinator)	SBOHVM	Graham Kerr	2797	<a href="mailto:davide.dominoni@glasgow.ac.uk">davide.dominoni@glasgow.ac.uk</a>
Dr Oskar Brattstrom (Course Coordinator)	SBOHVM	Graham Kerr	N/A	<a href="mailto:oskar.brattstrom@glasgow.ac.uk">oskar.brattstrom@glasgow.ac.uk</a>

Course communication will be via Teams, but all materials for course and exams will be accessible via Moodle. Ensure that you have these platforms set up to deliver messages to you as they come out (i.e. not as a weekly digest).

In the case of urgent change of plans we may send information by text message to your registered mobile.

If, during the same period, you need to contact us, regarding any queries or other matters, please use the following numbers:

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## TIMETABLE

TBC

## SESSION SUMMARIES

Ecology and Conservation of African Ecosystems (ECAE) is a L4 optional module offering a rich variety of academic activities and content. However, it is set up differently from most classes you have taken on campus. The first part of the course is based around weekly lectures relevant to the field part of the course. During the time spent in Kenya, there will be less formal lectures or actual exams; instead, you will spend considerable time in the field, carrying out practical projects and learn skills necessary for biological field work in savannah environments. You will also conduct your own field projects and experiments in small groups, based on project designs you will prepare before the actual field course. We will also read and discuss articles from the primary scientific literature on the animals and plants that surround you.

We intend to pack the roughly two weeks of course time in Kenya full of activities and experiences; there will be very little down-time. Our goal is to give you the fundamental experiences required to become an independent scientific thinker, with skills that will help you be a better student, scientist (no matter what your eventual career path), and world citizen. We will have two main bases while in Kenya: the first two nights we are staying in Nairobi to visit the National Museum and the African Butterfly research Institute, we will then head to the Mpala Research Centre for the rest of the time in the field. While at Mpala we will also do some day trips to other nearby areas of interest.

The formal academic content of this course has four components:

1. Scientific lectures and discussions in Glasgow
2. Scientific lectures and guest seminars in Kenya
3. Research projects in Kenya
4. Literature discussions in Kenya

**You are expected to attend and participate in all activities.**

## 1. Scientific lectures in Glasgow

In Glasgow there will be 4 lectures of 2 hrs each. The lectures will be an introduction to the course and to ecosystems characteristic of tropical African environments, with a particular focus on the fauna and flora of savanna habitats in Kenya. We also discuss Conservation Ecology and Human-Wildlife conflicts.

## 2. Scientific and research lectures in Kenya

While in Kenya, we will give several informal lectures on different themes. For instance:

- Visit to the Nairobi Natural History Museum for a guided tour which will include lectures by affiliated Kenyan researchers.
- Visit the African Butterfly Research Institute which is the world's most complete and well curated butterfly collection of African species.
- Introduction to the basic experimental design and statistical techniques, as well as field methodologies that are particularly useful for ecological and behavioural studies.
- How to write scientific texts and how to design effective presentation and poster layouts.
- A range of lectures in Mpala about specific projects linked to the ecology of African animals (including Baboons and Guinea fowls) and learn about the evolutionary process behind historic colonisation of savannah habitats by butterflies.

## 3. Research projects

The primary academic goal of ECAE is to give you an intensive and high-quality learning experience that incorporates with hands-on practical work and theory on conservation issues. You will therefore be spending a significant portion of your field time designing and implementing ecological studies in small groups. These projects all aim to test an explicit ecological or behavioural hypothesis through observation or experimentation.

The first days in the field will be largely spent exploring the landscape around the Mpala research centre, meeting local researchers and rangers. We will also visit local NGOs, charities, nature reserves and parks. We will often have lectures from either local researchers and experts, or us lecturers, sometimes in the evening. Lessons and strategies developed during these first days will help you and your classmates fine-tune and carry out a final independent project that you already prepared before we leave Glasgow. Students will be divided into three groups and will then design a group project on a specific topic.

Before we leave Mpala, each group will jointly present the preliminary results from your study to the rest of the group as well as invited local researchers. You will then individually write up a full project report that is handed in two weeks after we return

from Kenya. There will also be a task linked to a reflective statement about topics you encounter in Kenya. Staff will mark both these assignments and return grades within three weeks.

The exact projects that will be carried out is highly dependent on how the weather conditions in the month or two preceding our visit as well as what you as groups are most interested in studying. The staff have past experience of working at Mpala and will be at hand to guide you in your project designs. A few examples of project topics at Mpala that are common among visiting students are:

#### Ungulate foraging behaviour

Many kinds of ungulates are common at Mpala. This project could compare trade-offs in the foraging and vigilance behaviour of ungulates with different body sizes (including zebra, giraffe, impala, gazelle, and dik dik), designed in part as an introduction to the methods of study design, data collection, and statistical analysis for behavioural data.

#### Elephant damage

Elephants migrate through Mpala; although they are not always present in great numbers, their seasonal presence transforms the local environment. This project could examine the abundance and distribution of elephant damage on acacia trees. It is designed as an introduction to methods of study design, data collection, and statistical analysis for ecological data.

#### Acacia-ant mutualisms

One of the most famous long-term studies conducted at Mpala has explored the ecology and behaviour of the four species of ants that compete for living space in whistling-thorn acacia trees. Because these trees and their ants are abundant and easily studied, they make great subjects for student research. In this project, the class breaks into small groups to brainstorm and design their own experiment involving some component of acacia-ant mutualism. This project provides a friendly introduction to basic statistics and acts as a trial-run for writing a full research report. It also helps students consider the types of questions most amenable to hypothesis based research.

#### Bird social networks and cooperative breeding

Many amazing social birds are present and abundant at Mpala that will constitute interesting study subjects to look at aspects related to social behaviour and cooperation. Two of the most common and readily observable are Vulture Guineafowl and White-browed Sparrow Weaver. This project could compare how

group size influence social interactions, vigilance, home range and other behavioural traits.

During the first 'orientation' days in the field, we suggest many possible research topics as the group encounters different organisms and systems, but we will stress the benefit for students to develop insightful questions of their own. You will be tasked with identifying possible research topics, refining the hypotheses to be tested, developing critical predictions, designing effective tests, and collecting pilot data. Once projects have been refined, you will collect the bulk of your data in a group and then write up your project report in the form of a short scientific paper. The submission of the final project paper will be three weeks from the date of return from the field course. Students will also be asked to write a reflective diary. This diary should be a personal reflection on the good and bad things experienced during the final project, and in particular about aspects related to teamwork and problem solving.

#### 4. Literature discussions

While in Kenya, in keeping with the research orientation of the course, we will occasionally hold daily discussions based on scientific papers you all will have to read beforehand. Understanding how to critically read and discuss such papers are instrumental in understanding important themes in tropical biology, behavioural ecology, evolutionary biology, and conservation biology. They also serve as models for your own research reports. Nearly every paper we will choose involves the animals and plants that you will see all around you in Kenya, and many have actually been conducted at Mpala or other nearby natural areas, including Hells Gate NP and Lake Naivasha NP. We will lead the first discussions, but as the course progresses, the students will moderate the discussion of a topic (usually involving two or three thematically related papers). This exercise helps build your skills in interpreting the primary scientific literature. The papers we will discuss will be selected among some of the following topics:

- Ecology and biogeochemistry of African ecosystems
- Fire and grazers in African ecosystems
- Community ecology and grazer competition
- Predator/prey dynamics of ungulates and carnivores
- Cheetah conservation
- Rhino conservation
- Community-based conservation in Africa
- Re-wilding and human/wildlife conflict

- Ungulate mating and social systems
- Equid social behaviour
- Baboon social behaviour
- Elephant social behaviour
- Hyrax social behaviour and metapopulation dynamics
- Cooperative breeding in bee-eaters
- Cooperative breeding in African starlings
- Sexual selection in widow birds
- Sexual selection in lions
- Human mating systems of African cultures

## BASIC LOGISTIC AND ORGANISATIONAL INFORMATION WHILE IN KENYA

For general and more specific information about travelling to Kenya, please reference to the UK government website: <https://www.gov.uk/foreign-travel-advice/kenya>

### *Travel*

Flight tickets will be booked by the School of Life Sciences for everybody on the trip. When interacting with anyone back home in UK, remember that Kenya is between 2 or 3 hours ahead of the UK; 2 hours when we arrive, and 3 from the beginning of November when UK daylight saving time ends (not observed in Kenya)

### *Immigration*

Visa is needed for most nationalities and we will provide more information on this in early September. If you need a visa, you can apply for single entry and transit visas on the [evisas website](#). You can also apply for these, and other types of visa, at the Kenya High Commission in London. For more information, see the website of the [Kenya High Commission](#). See [Visas](#).

Visas cost about £25 (price subject to change – Scottish currency not accepted and there are no ATMs before the visa stand). On passing through immigration control in Kenyatta airport, please ensure that your visa, once stuck into your passport, is properly stamped by the immigration officer, otherwise it is not valid.

Your passport must be valid for at least 6 months on arrival. In Kenya, you should have photo-identification with you at all times. The Mpala research station will also make a copy of your passport on arrival. Citizens of some countries must buy visas before traveling to Kenya. Please check with your embassy in Kenya.

### *Currency*

The local currency of Kenya is the Kenyan shilling (KES). The current conversion is £1 to 180 KES. Local currency can be obtained at the airport and at ATMs and local banks in Nairobi. You don't really need much cash during your stay except for if you go outside the camp to buy souvenirs or during day off excursions. You will need cash for water etc. during such trips so it is definitely worth having at least some Kenyan cash. Ideally bring also some USD\$ as these are the second currency of Kenya and often locals expect foreigners to pay in dollars. British Pounds are less easy to exchange, and Scottish Pounds impossible to exchange.

### *Telephone and internet.*

UK mobile phones generally work in Kenya, but you will need to set up international roaming with your provider, and phoning to the UK and receiving calls is expensive. Mobile reception is extremely patchy outside of Nairobi and any wifi network is usually not good enough to cope with large amounts of Skype and Whatsapp voice calls. E-mail and instant messaging are usually the best ways to communicate. The stay in Mpala can also be seen as an excellent opportunity for some down-time from social media and instead socialise as a group.

Do not assume that you will be able to download papers while in Kenya.

### *Location and accommodation*

The field course will take place in two different locations in Kenya.

We will arrive late at night on the first day and head straight to our hotel (<http://www.wildebeestecocamp.com>) where we will stay for the first two nights. The morning after arrival we will head to the National Museum to meet some of their staff who will tell us more about Kenyan nature. There will also be opportunities to learn more about Kenyan culture and history. In the late afternoon we will visit the African Butterfly Research Institute located in the Nairobi suburb of Karen.

The morning after we will head north to Mpala using shuttle buses provided by a professional company with drivers. The Mpala research station is guarded 24 hours a day, and a two-wire electric fence surrounds the entire camp area in order to deter large mammals like hippos, buffalo, and elephants. One of the pleasures of staying at Mpala is hearing animals like hyenas, zebras, and owls calling in the distance as you fall asleep, or watching elephants and giraffes walk by across the river. We will stay at Mpala for about two weeks, sleeping in comfortable dormitories.

More info about Mpala here: <http://mpalalive.org/> and here <https://mpala.org/>.

### *Getting there & around*

The road from Nairobi to the Mpala field station is in fairly good condition, but be prepared for bumpy and dusty dirt roads within Mpala itself! We will mostly be traveling in 7 to 9 passenger minivans or in land rover-type vehicles, all with a 'pop-top' that raises up so that passengers can stand and look at wildlife from the vehicles. The same applies to the day drives from Mpala to nearby locations, and from Mpala back to Nairobi.

## *Meals*

While at Mpala we will eat three ample meals a day at the same camp; they are prepared by Mpala cooks who have worked with many past groups of visiting students. Vegetarian dishes are always available.

## *Water*

Drinking and washing water is purified multiple times and is safe for consumption. For hot showers, we usually use river water, which is safe for bathing, but not for drinking.

## *Electricity*

Electricity is available at the main Mpala Centre almost at all times. We charge laptops, camera batteries, etc. on a regular basis in the classroom building at the main research centre. Both 111 and 220 volt outlets are available. The power sockets are of the type-G, the British type, so if you plan to bring cables with a different type of plug you will need to bring an adapter, too.

## *Bedding & laundry*

Sheets, blankets, towels and pillows are all provided. Although most personal laundry is done by the camp staff, we ask you to wash your own underwear (by hand). We provide laundry detergent. The staff washes laundry daily, usually with a one-day turn-around, so it's a good idea to pack lightly and bring relatively few clothes.

## *Climate*

In October the temperature at central Kenya can be surprisingly cold in the evenings and overnight--especially when we go on night drives. Everyone should bring some warm clothes, including a warm fleece-style jacket (or equivalent) and something warm to sleep in. November is the season of the "short rains", which fall mostly at night. However, the rainfall has little predictability and may fall at any time. Warm days and cool nights predominate, with moderate humidity. So, pack your bags accordingly.

## *Landscape*

Mpala is located on the Laikipia Plateau in north central Kenya, just north of the equator, northwest of Mt. Kenya and at an elevation between 1700-2000m above sea level. The northern two-thirds of Mpala is underlain by dissected Archean terrain with thin dark red sandy loams (latosols). The southwestern one-third of the property is characterized by a 100m high phonolite lava flow. The Centre is made up of 49,107 acres of savannah and dry woodland and bordered by two rivers the Ewaso Ngiro and the Ewaso Narok: ideal for an array of research. There are vast expanses of low-lying plains, covered with thorny scrub where unique rocky kopjes majestically rise above the skyline. Fifteen dams have been constructed on Mpala, and there are more than 250km of internal roads.

### *Things to Bring*

- Warm weather clothing for the daytime (field shirts, T-shirts and light trousers)
- A few sweaters/ fleeces/ shawls/ shukas for the chilly evenings
- Raincoat or rain poncho, water proof trousers not necessary (avoid expensive Gore-Tex gear as the area is full of thorny plants!)
- Torch/ flashlight (headlamps are especially useful)
- Band-Aids
- Antiseptic cream, anti-diarrhoeal, antacids and aspirin
- Prescription medication that you may need
- Toiletries
- Insect repellent
- Sunscreen
- Hat for sun protection
- Lip balm
- Sunglasses
- Large water bottle
- Small backpack for day excursions
- Camera
- Binoculars
- Hiking boots
- Sturdy sandals
- Pleasure reading and/or biology books to read and donate to Mpala's library

Nanyuki is a big town, and much is available there, from toiletries to medicines and special food items.

Mpala provides:

- Mosquito netting
- Towels
- Linens
- Laundry service

### *What not to bring*

Space is limited in the vehicles, so it is important NOT to bring a lot of excess stuff with you. If you can't fit everything in one checked piece of luggage plus your carry-on, you are bringing too much. The tickets we have allow for a single bag of 23 kg per person.

## HEALTH AND SAFETY

## *General health considerations*

All students will need to read and sign a risk assessment form before taking part in the course.

The UK Government's website discusses health risks in Kenya and should be consulted by anyone travelling to Kenya; see <https://www.gov.uk/foreign-travel-advice/kenya>. Visitors also are advised to check with their doctor or Health Department for necessary immunizations before arrival. We advise sleeping under mosquito nets (provided). Water borne diseases can be prevented by drinking only bottled water, or water that you know is sterilized and filtered.

Our highest priority is to ensure the health, safety and welfare of students and staff. The areas of Kenya that we visit are considered to be a safe location for this field course, but there are, of course, potential hazards. Please give safety briefings your full attention and act responsibly. If you have any questions or concerns about any aspect of safety, please raise them with the staff. You are reminded that the University of Glasgow requires you to cooperate with measures put in place to protect your health and safety and those of your fellow students and staff. Students are supervised at all times while in Kenya.

Each of the staff has received first aid training and first aid kits will be available in the accommodation and at each field location. In addition, you are strongly advised to carry your own small medical kit with you. Since staff cannot provide directly to you any items that might cause an allergic response, this personal kit should contain, in addition to any personal medication (such as asthma inhalers), such items as painkillers (e.g. aspirin or paracetamol), antiseptic cream, sunscreen, insect repellent and insect bite (antihistamine) cream or tablets.

Depending on the nature and severity of a particular injury or illness, there are several medical options in Nairobi. At Mpala, there is a basic first aid box in the Administration Office and in the Control Room for small injuries (12 research centre staff are trained and certified in occupational first aid and fire safety). Mpala's mobile clinic, based at Mpala Ranch Ltd., provides some medication and basic treatment 24 hours a day. The Nanyuki Cottage Hospital, a private hospital located in Nanyuki town, less than an hour away, has excellent, well-trusted staff and can treat most illnesses, injuries and minor emergencies. Emergency evacuation options available from Mpala include road transport, Flying Doctors and Tropical Air Charters.

## *Vaccinations*

First and foremost all participants definitely need to get some sort of **Malaria Prophylaxis**. If you never taken any before you are probably best of getting advice from a GP or from a travel clinic. Some off the available prophylaxis solutions can interact with other medication so it should always be discussed with a doctor before first use. Please note that you may want to avoid the antimalarial prophylactic Doxycycline because it makes many people extremely sensitive to the sun.

For vaccines, the following are **must haves for Kenya**, it is possible you have several of these already from vaccination schedules you were given many years ago so do double check:

- Diphtheria
- Hepatitis A
- Poliomyelitis
- Tetanus

There are **additional vaccine options** you might also consider, these are not strictly needed for the type of work we will be doing, but if you think you are likely to travel to Kenya and similar countries in the future it might be good to invest in some of them. For many of these vaccinations you might need multiple doses over about a year's time to gain a very long immunity, but having started a course of vaccination you will already have good protection for the time you are going to be in Kenya during this course.

- Hepatitis B
- Meningococcal Meningitis
- Rabies
- Typhoid
- Yellow Fever

Of the ones on the optional list we would certainly consider Typhoid and if you think you are likely to work actively with animals Rabies is not a bad choice. We are not going to handle wild animals with risk of rabies transmission during the course, but if you are seriously considering a career in 'hand's on conservation' of wild animals it might be a good investment.

Finally, have a look at this link for more detailed information: <https://www.fitfortravel.nhs.uk/destinations/africa/kenya>

### *Safety considerations*

Apart from the first two nights in Nairobi we will be based at the Mpala Research Centre for most of our time of the field trip. The regions all around Mpala have remained peaceful, even during the election-related political unrest that occurred in early 2008. The Mpala Centre itself is highly secure and isolated in the African bush, far from major cities or other population centres, it also has well trained and experienced staff. Contingency plans are in place in the event of an emergency, large or small. The camp itself is surrounded by a two-wire electric fence that deters large animals such as elephants, hippos, and buffalo. Except for time spent in the fenced area, lecturers will be present at all times with the students and never leave them unsupervised for any appreciable period. Potentially dangerous animals such as elephants, buffalo, lions, cobras, bees, and hippos are common at Mpala.

Therefore, when in the field, students are always accompanied by field assistants and security staff, many of whom grew up in the Mpala area, to make sure students are kept at a safe distance from potentially hazards. These protocols applies to all non-local researchers at Mpala, not just to visiting groups of students.

We have an extensive series of formal contingency plans in place to guide our actions were anything to happen (politically or medically, mild to emergency) while we are in Kenya.

We constantly monitor the security situation in Kenya to help ensure that it causes no problems for our course or its participants. We have worked closely with Cornell's risk management and international program professionals to design ways of minimizing any risks to course participants. All of us staunchly believe that the safety of our students is by far the paramount consideration.

You will get more detailed health and safety briefings during the info sessions in Glasgow before our trip and on arrival in Kenya. Specific health advice is also contained in the Risk Assessment.

#### *Health emergency notifications*

Prior to departure, we gather detailed emergency contact information from all students, and we will immediately notify parents and/or other designated contacts in any situation requiring formal medical treatment. We don't normally use these emergency contacts for mild medical situations that do not require a visit to a clinic or doctor, unless the student asks that we do so.