



UNIVERSITY OF  
CAMBRIDGE

Institute of Continuing Education

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# **Undergraduate Certificate in Genetics**

**2018-2019**

**Course code: 1819CCR105**

## **COURSE GUIDE**

University of Cambridge Institute of Continuing Education, Madingley Hall, Cambridge, CB23 8AQ  
Tel 01223 746222 [www.ice.cam.ac.uk](http://www.ice.cam.ac.uk)

Welcome to the **Undergraduate Certificate in Genetics**, a University of Cambridge award offered by the Institute of Continuing Education (ICE). The Certificate is taught and awarded at FHEQ level 4 (i.e. first-year undergraduate level) and attracts 60 credits. The award is completed in one academic year and each unit (term) is equally weighted. For further information about academic credit please see our website <http://www.ice.cam.ac.uk/studying-with-us/information-for-students/faqs/3-credit-faqs>

The **Undergraduate Certificate in Genetics** focuses on DNA at the core of life - how DNA works and how it informs the structures and functions of living things. The course explores key scientific advances and recent changes in our understanding of genetics. You will learn about medical and biotechnological breakthroughs and future possibilities including genome editing. The course explores the mechanisms by which genetic variation is created and how genes are passed from generation to generation.

As well as a broad introduction to the subject, the course aims to promote discussion about the current and future application of the Human Genome Project and genomic data in the medical field. Presentations are complemented by assignments and lab work. These give participants experience in data interpretation and presentation. The course includes a visit to the Sanger Institute and to a biotechnology company.

The **Undergraduate Certificate in Genetics** is designed as a natural complement to the Undergraduate Certificate in Evolutionary Biology, allowing students to explore both molecular and whole organism aspects of biology.

The course offers three termly units, and a syllabus and reading and resource list for each of these units is included in this course guide.

The course aims to:

1. show what DNA is at the molecular level and how it is read by the cellular machinery, how it is replicated, how it is maintained and mutated, and the implication of such mutations / changes for human health and diseases
2. introduce students to the core concepts of what genes are and how they work, enabling students to appreciate the transfer of genetic information in living cells
3. give insight into how genes are orchestrated and function together as part of the genome, what can go wrong and how they can be manipulated in the laboratory
4. detail key advances in modern genetic techniques and projects such as genome wide association studies and disease-risk prediction, the 100,000 genomes project, gene therapy, and the use of stem cells
5. cover the principles of epigenetic control of gene expression and how this can go wrong in disease
6. explain how genetic material is passed from generation to generation and how this can influence the genetic structure of whole populations
7. discuss the theory of evolution and the evidence that supports it.

## Transferable skills for further study and employability

- The capacity for independent thought and judgement
- The development of independent learning, study and time management skills
- The deployment of skills in critical reasoning
- The development of competence in using IT to support one's work
- The ability to work with others, productively and equitably
- The qualities necessary for employment requiring the exercise of some personal responsibility and the demonstration of high levels of motivation and personal commitment through part-time study
- The ability to reference sources of information to support one's reasoning

## Study hours

The award of academic credit is a means of quantifying and recognising learning, and within the UK, one credit notionally represents 10 hours of learning<sup>1</sup>. Each of the units in this course attracts 20 credits so students should expect to need to study for approximately 200 hours in total to complete each unit successfully. However, it is recognised that students study at different paces and use a variety of approaches, so this is a recommendation, rather than a hard-and-fast calculation.

1 'Academic credit in higher education in England – an introduction'. The Quality Assurance Agency for Higher Education, 2009

## Teaching staff

### Course Director:

**Dr Tom Monie** is a protein biochemist with a long-standing interest in infection and immunity. He is a Fellow of Christ's College, University of Cambridge, where he also acts as a Tutor and the Director of Studies in Part 1A Natural Sciences.

Tom's extensive experience in teaching within the University includes undergraduate supervisions, practical classes and lectures; he currently delivers the first year "Genes in Action" course for the Biology of Cells. Recent publication topics have included cat allergy - which was a global media story- Crohn's Disease, inherited auto-inflammatory genetic diseases, bacterial toxins, and species variation in immunity and inflammation.

Many students have benefitted from his involvement in a wide range of teaching activities targeted at the provisions of subject-specific and transferable skills for graduate students. Tom is a firm believer that learning should be fun, that student participation is central to this process, and that successful teaching requires responsiveness to the needs of the students. He aims to instill these elements into his teaching and engagement activities.

## Tutors

The course will be taught by a team of tutors whose expertise covers a wide range of different disciplines and a wealth of biological topics. These include:

**Dr Maya Ghoussaini** completed a MSc degree in Gene Expression and Infectious diseases and PhD degree in Medical Genetics and Epidemiology at the Université de Lille II / Faculté de Médecine Henri Warembourg, France. During this period, she worked in the Pasteur Institute on the genetic susceptibility for childhood obesity and type 2 diabetes. In 2007, she was appointed as a Research Associate at the Department of Oncology at the University of Cambridge and a Postdoctoral Researcher at St Johns College, Cambridge. Her research focused on the genetic susceptibility of common cancers through identification of regions of the human genome involved in breast cancer development and the disease causative variants within these regions (genetic mapping). It also focused on how and why these genetic variants affect cancer susceptibility. Since 2017, she holds a Genetic Analysis Team Leader position at the Sanger Institute working on the Open Targets project where large-scale human genetics and genomics data are integrated to change the way drug targets for genetic diseases are identified and validated. She has also a particular interest in the Genetic Engineering field. Dr. Ghoussaini has a strong teaching interests and lectures on genetics as part of the MPhil course in Epidemiology and Public Health and has supervised undergraduate Part 1A students in the Natural Sciences Tripos (Mendelian Genetics, Bacterial Genetics, Physiology of Organisms).

**Dr Leighton Dann** is the Research and Development Officer for Science and Plants for Schools (SAPS), a charitable organisation within the University of Cambridge. Part of this job is to adapt some of the newer techniques of biochemistry and molecular biology, to enable them to be used in schools. He also runs workshops on these techniques for teachers and trainee teachers. Prior to this he taught Biology in a secondary school for a number of years. Even earlier, he conducted clinical research in the field of antenatal diagnosis of inherited metabolic diseases.

For a list of tutors who teach on the biological science programmes, please see the Biological and life sciences subject page on the Institute's website.  
(<http://www.ice.cam.ac.uk/courses/courses-subject/biological-and-life-sciences>)

## Administrative staff

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## Venue

Madingley Hall is the University of Cambridge's campus dedicated to continuing education for adults. The magnificent Hall was built in the sixteenth century and acquired by the University in 1948. The Hall has been used by the Institute of Continuing Education as a venue since 1975.

You will be taught for part of the course in one of 14 classrooms at Madingley Hall where classrooms are arranged and equipped to encourage effective small group learning and peer interaction. Technology-enhanced learning, including lecture capture where appropriate, is used in many classes and wi-fi is available throughout the site. We also provide a range of social learning spaces which you can make use of before, or after, your class. Seven acres of superb gardens and grounds designed by Capability Brown provide space to think, reflect and relax. We offer a range of catering including formal dining, sandwiches and snacks, and a full-service bar. If you are travelling a long distance you may wish to book accommodation in one of the Hall's 62 en suite bedrooms.

The Hall is situated three miles west of Cambridge with easy access from the M11 and the A14. There is ample free on-site car parking. Central London and Stansted Airport can be reached in under an hour by train from Cambridge railway station. Taxis from the railway station to Madingley Hall typically take around 20-25 minutes. Full directions are given on our website at: [www.ice.cam.ac.uk/about-us/how-find-us](http://www.ice.cam.ac.uk/about-us/how-find-us)

The other teaching venues are the Science Education Centre at Homerton College, Hills Road, Cambridge which offers excellent laboratory facilities and is situated at the back of the College site, beside the main car park; and Strangeways Research Laboratory, Hills Road, Cambridge CB1 8RN. These venues are both within a 25 minute walk from Cambridge railway station.

Lunch will be provided where day schools take place at Madingley Hall, but not where sessions are held at other venues.

## Contact details of ICE

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*Please also refer to the 'information for students' section on ICE's website [www.ice.cam.ac.uk/studying-with-us/information-for-students](http://www.ice.cam.ac.uk/studying-with-us/information-for-students) and the 2017/18 Student Handbook for award-bearing courses for further information and guidance relating to all aspects of the course including study skills, assignments, assessment and moderation. The Course Information and Help and Guidance section of the ICE VLE will also contain valuable information specific to your course.*

*Information correct as at 08<sup>th</sup> October 2018*

## Syllabus for first unit

Michaelmas term 2018

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# DNA, the stuff our genes are made of

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<b>Start date</b>	13 October 2018	<b>End date</b>	8 December 2018
<b>Day</b>	Saturday	<b>Time</b>	10.00am – 5.00pm
<b>Venue</b>	Madingley Hall, Madingley, Cambridge (13 October) Science Education Centre, Homerton College, Hills Road, Cambridge (20 October, 3 November, 10 November) Strangeways Research Laboratory, Hills Road, Cambridge (25 November)		
<b>Course Director</b>	Dr Tom Monie	<b>No of meetings</b>	Five Saturday day-schools on 13 and 20 October, and 3, 10 and 24 November 2018

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### Aims

This unit aims to introduce the core concepts of what genes are and how they work, enabling students to appreciate the transfer of information from DNA to living cells. Practical work in the laboratory will allow students to observe cell structure and to appreciate at first-hand how DNA can be handled and manipulated in the laboratory. Consideration of genomic sequencing and DNA profiling will introduce students to an example of the application of specialised DNA techniques in modern society and associated ethical concerns.

### Content

DNA molecules are at the core of life and they determine what we are. The DNA code is inherited from generation to generation and contains instructions for the development and life functions of all known organisms.

This unit examines the structure of DNA, from the initial experiments by Francis Crick and James Watson here in Cambridge in 1953, to our current understanding of the molecular machines that run our cells. We will consider how genes are co-ordinated and how they determine growth and development in organisms.

Our understanding of how genes work has developed rapidly, partly because DNA is particularly amenable to manipulation in the laboratory. The unit explains how scientists investigate gene activity and determine the molecular mechanisms involved. The discovery

and development of DNA profiling (fingerprinting) is considered as an illustration of an application of widespread significance arising from a programme of pure research.

### Presentation of the unit

The five day-schools will consist of a mixture of lectures illustrated by Powerpoint, group-based work, and practical sessions, which will give students experience of laboratory work.

- Diagrams, models, video-clips and animations will be used to illustrate concepts and molecular mechanisms wherever possible.
- Discussion in class will facilitate an appreciation of the concepts and ethical issues of subjects under consideration.
- Laboratory days will involve practical bench work and data interpretation.

### Provisional course structure

Date	Session	Venue	Indicative content
13/10/2018 10.00am – 5.00pm	Day-school one	Madingley Hall	This session provides an overview of the course and its content. It provides a gentle introduction to the use of DNA as the universal hereditary material. The day also includes study-skills sessions on essay writing, referencing and accessing scientific papers.
20/10/2018 10.00am – 5.00pm	Day-school two	Science Education Centre	This session describes the flow of information, from gene sequence to the protein product. It starts with exploring the DNA structure, its replication and how it is packed into chromosomes. This session ends with a 3 hour practical, exploring cell structure ( <b>Assignment 1</b> ).
03/11/2018 10.00am – 5.00pm	Day-school three	Science Education Centre	This session explores the transcription and translation processes. It is followed by a case study on DNA profiling and finishes with a description of mRNA splicing and the evolutionary advantage.
10/11/2018 10.00am – 5.00pm	Day-school four	Science Education Centre	This session explains the concept of mutations and the use of PCR as a technique in modern genetic research. It includes a hands-on practical that involves DNA extraction and handling (both from strawberries and from the students themselves) ( <b>Assignment 2</b> ).
24/11/2018	Day-school five	Strangeways Research Laboratory	This session introduces students to the concept of high throughput genotyping and sequencing platforms. A tour of the research laboratories is provided and students will discuss the ethical and social issues related to DNA testing and genome sequencing.

## Learning outcomes

As a result of the unit, within the constraints of the time available, students should be able to:

- demonstrate an understanding of what genes are and how DNA sequence determines protein function;
- perform routine laboratory procedures to manipulate DNA with an understanding of the basic principles involved;
- demonstrate an understanding of the analysis and interpretation of experimental data in molecular biology.

## Student assessment

The course requires a commitment to reading and pre-class preparation, including some specific reading between class sessions.

To help students get to grips with scientific terms and concepts, a workbook will be available to download from the VLE at the start of the course: this contains key words and concepts which the students are expected to define and discuss.

There are a large number of genetics and molecular biology texts that provide excellent introductions to various aspects of genetics. Some of these are listed in the reading list; other recommendations will be posted in the VLE. Many of the texts are relevant to multiple units and students are recommended to select those of particular personal interest. For some texts older editions may still contain the relevant information and students are welcome to discuss this with the Tutors or Course Director. Background reading will greatly increase appreciation of the course.

**There are two assignments associated with the unit and they are equally weighted:**

**Assignment 1:** An essay discussing the transfer of information from DNA to the rest of the cell (2,000-2,500 words or equivalent). The precise title will be provided in the relevant day-school.

**Assignment 2:** A write up of the DNA extraction practical session in the style of a scientific report or publication. Example structures will be provided details should be included of the experimental procedure, interpretation of the data collected, and discussion of the potential downstream application of purified DNA (1,000-1,500 words or equivalent).

All students are expected to upload their assignments into the VLE. Any assignments not suitable for uploading into the VLE will be clearly identified.

Closing date for the submission of assignments: **before 12 noon on Monday 7 January 2019 (GMT\*)**

*\*Greenwich Mean Time*



## Reading and resource list

AUTHOR	TITLE	PUBLISHER
Arney, Kat	Herding Hemingway's Cats: Understanding how our genes work	Bloomsbury Publishing, 2016
*Alberts, Bruce <i>et al.</i> ,	Essential cell biology (4 <sup>th</sup> Edition)	Garland Science, 2013
Brown, Terry	Gene Cloning and DNA Analysis	Wiley Blackwell, 2016
*Krebs, J <i>et al.</i> ,	Lewin's Essential Genes (3 <sup>rd</sup> Edition)	Garland Science, 2012
Krebs, J <i>et al.</i> ,	Lewin's Genes XII	Garland Science, 2018
McLennon, A <i>et al.</i> ,	BIOS Instant Notes in Molecular Biology	Garland Science, 2012
Mukherjee, Siddhartha	The Gene: An Intimate History	Vintage, 2017
Ridley, Matt	Francis Crick: Discoverer of the Genetic Code	Harper Perennial, 2006
Tropp, Burton E.	Molecular Biology - Genes to Proteins (4 <sup>th</sup> Edition)	Garland Science, 2011
Tropp, Burton E.	Principles of Molecular Biology	Garland Science ,2013

\* These are the best introductory textbooks

# Syllabus for second unit

Lent term 2019

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## From genes to genomes

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<b>Start date</b>	19 January 2019	<b>End date</b>	16 March 2019
<b>Day</b>	Saturday	<b>Time</b>	10.00am – 5.00pm
<b>Venue</b>	Three day-schools are held at Madingley Hall (19 and 26 January, 16 March 2019), with the remaining day-school at the Science Education Centre, Cambridge (2 February 2019).		
<b>Course Director</b>	Dr Tom Monie	<b>No of meetings</b>	Four Saturday day-schools on 19 and 26 January, 2 February and 16 March 2019

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### Aims

This unit explores some of the many areas of active whole genome research which followed on from the Human Genome Project and led to an unprecedented transformation in our biological understanding of human diseases and medical practices. We explain how genetic variation across the human genome is currently used to study susceptibility to common late-onset diseases. This unit also introduces gene editing and epigenetics, including the involvement of epigenetics in gene expression and how this can go wrong in disease. We will also introduce stem cell biology and proposed stem cell therapy.

### Content

The unit focuses on the Human Genome Project, the achievements that followed, and its relevance to health and disease. We look at the technology developed and the current methods of researching genome data. We also introduce the rapidly growing field of 'bioinformatics' and discuss its impact on medical research and modern health care. We focus on the recent emergence of Genome-Wide Association Studies and the identification of new chromosomal regions associated with diseases. We explain how these findings are starting to shed light on defective biological process mechanisms at the cellular level and will briefly discuss their implications for healthcare through screening programs, early diagnosis, and personalised treatments.

This unit also gives an introduction to the fundamentals of gene editing, including CRISPR/Cas9, and of epigenetic control and its crucial role in disease. We investigate how some genes are activated while others are silenced, and how is this controlled.

## Presentation of the unit

The four day-schools consist of informal lectures illustrated by Powerpoint, group work and practical sessions.

- Diagrams, models, video-clips and animations will be used to illustrate concepts and molecular mechanisms wherever possible.
- Discussion in class will facilitate an appreciation of the concepts being taught.
- Laboratory days will involve practical bench work and data interpretation.

## Provisional course structure

Date	Session	Venue	Indicative content
19/01/2019 10.00am – 5.00pm	Day-school one	Madingley Hall	This first session explores the human genome project, the lessons learnt from it and the use of Genome Wide Association Studies ( <b>Assignment 1</b> ). It also provides an opportunity to discuss the previous assignments.
26/01/2019 10.00am – 5.00pm	Day-school two	Madingley Hall	This day school will look at understanding cancer genomes and introduces some of the computational tools that allow genomic information to be explored ( <b>Assignment 2</b> ). It finishes with a discussion about the legal aspects of genetics and copywriting of genomes.
02/02/2019 10.00am – 5.00pm	Day-school three	Science Education Centre	This session involves a PCR-based practical exploring genes and cancer. It discusses how normal and cancer cells are grown in the lab and genetically edited to understand their behaviour and characteristics, and introduces the concept of pharmacogenomics.
16/03/2019 10.00am – 5.00pm	Day-school four	Madingley Hall	This session includes a lecture on the clinical aspects of genome sequencing. It also introduces the fundamentals of epigenetics and its role in diseases as well as the application of gene editing.

## Learning outcomes

As a result of the unit, within the constraints of the time available, students should be able to:

- show they have considered the value of the information generated by the Human Genome Project and how it has aided our understanding of human genetics and disease;
- demonstrate an understanding of how large datasets, such as HAPMAP/100,000 Genomes Project, can be used and interpreted;.

## Student assessment

**There are two practical assignments associated with this unit and they are equally weighted:**

**Assignment 1:** An essay discussing how the Human Genome Project has advanced our understanding of human genetics and human disease (1,500 – 2,000 words). The precise title will be provided in the relevant day-school.

**Assignment 2:** A series of short answer questions requiring application of the computational skills introduced during the Unit and demonstrating the ability to access and extract information from publically accessible genome-related databases (1,500 – 2,000 words).

All students are expected to upload their assignments into the VLE. Any assignments not suitable for uploading into the VLE will be clearly identified.

Closing date for the submission of assignments: **before 12 noon on Monday 15 April 2019 (BST\*)**

*\*British Summer Time*

## Reading and resource list

AUTHOR	TITLE	PUBLISHER
Alberts, Bruce <i>et al.</i> ,	Essential cell biology (4 <sup>th</sup> Edition)	Garland Science, 2013
Carey, Nessa	The Epigenetic Revolution	Icon Books Ltd, 2012
Carey, Nessa	Junk DNA: A journey through the dark matter of the genome	Icon Books Ltd, 2015
Cobb, Matthew	Life's Great Secret: The Race to Crack the Genetic Code	Profile Books, 2015
Hartl, Daniel and Cochrane, Bruce	Genetics: Analysis of Genes and Genomes	Garland Science, 2018
Krebs, J <i>et al.</i> ,	Lewin's Essential Genes (3 <sup>rd</sup> Edition)	Garland Science, 2012
Krebs, J <i>et al.</i> ,	Lewin's Genes XII	Garland Science, 2018
Sulston, John	The Common Thread	Joseph Henry Press Books, 2002
Tobias, ES <i>et al.</i> ,	Medical Genetics (6 <sup>th</sup> Edition)	Wiley Blackwell, 2011

Venter, Craig	A Life Decoded	Penguin Press Science, 2008
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## Syllabus for third unit

Easter term 2019

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# Genetics: past, present and future

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<b>Start date</b>	11 May 2019	<b>End date</b>	8 June 2019
<b>Day</b>	Saturday	<b>Time</b>	10.00am – 5.00pm
<b>Venue</b>	Madingley Hall, Madingley, Cambridge (11 May and 8 June) Science Education Centre, Homerton College, Hills Road, Cambridge (18 and 25 May and 1 June)		
<b>Course Director</b>	Dr Tom Monie	<b>No of meetings</b>	Five Saturday day-schools on 11, 18 and 25 May, 1 and 8 June 2019

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### Aims

This unit discusses genetic inheritance and the theory of evolution and introduces the science behind the inheritance of specific characteristics, by considering how genes are passed on from generation to generation. Our aim is to promote an understanding of the mechanisms of inheritance in families and then an appreciation of the distribution of variation within populations and the interaction between genes and the environment.

This unit also discusses, and includes practical sessions exploring, the potential of genetic manipulation and examines the benefits and dangers of manipulating the human genome and human reproductive processes through gene therapy.

### Content

This unit explains how genetic variation is generated, passed on in families and distributed among populations. The diversity of gene frequencies in different populations are investigated with examples of the effects of chance, selection and migration.

The unit also centres on the techniques and applications of genetic technologies, how we can copy genes, move them around, and some of the rapid sequencing techniques developed through modern genomics. Teaching sessions cover the particular issues of genetically modified organisms, genetic diseases, nature versus nurture, and gene therapy. Students will also be given the opportunity to prepare and deliver a presentation on a genetic-related topic of their choosing.

### Presentation of the unit

The five day-schools will consist of informal lectures illustrated by Powerpoint, practical sessions and student-led presentations.

- Diagrams, models, video-clips and animations will be used to illustrate concepts and molecular mechanisms wherever possible.
- Discussion and group-working in class will facilitate an appreciation of the concepts being taught.
- Laboratory days will involve practical bench work and data interpretation.

### Provisional course structure

Date	Session	Venue	Indicative content
11/05/2019 10.00am – 5.00pm	Day-school one	Madingley Hall	This day-school starts by discussing evolution and its connection with genetics including how genetic variations are generated and passed on in families and distributed among populations. It explores how genes and environment interact with each other <b>(Assignment 1)</b> and introduces the study of ancient DNA. There is an opportunity to discuss the previous assignment.
18/05/2018 10.00am – 5.00pm	Day-school two	Science Education Centre	This session explores the Y chromosome and mitochondrial DNA; investigates gene knockouts and gene therapy; and looks at the evolution of drug resistance and ways to stop antibiotic resistance.
25/05/2018 10.00am – 5.00pm	Day-school three	Science Education Centre	This session includes a three-hour practical on bacterial transformation and applications of Green Fluorescent Protein <b>(Assignment 2)</b> . We end with student presentations on a variety of research topics.
01/06/2019 10.00am – 5.00pm	Day-school four	Science Education Centre	This session includes a follow-up practical, focussed on protein separation and purification. It ends with a presentation on the use of genetics to trace human migration.
08/06/2019 10.00am – 5.00pm	Day-school five	Madingley Hall	This last session continues with student presentations and discussions on topics of interest and includes a summing up of the course.

## Fieldtrips

This course also involves a fieldtrip to visit Illumina OR the Sanger Centre, both of which are located about 15 miles out of Cambridge. A date for this visit will be confirmed closer to the time of the trip and usually takes place on a Friday before one of the teaching days towards the end of the Lent term or during the Easter term.

## Learning outcomes

As a result of the unit, within the constraints of the time available, students should be able to:

- demonstrate an understanding of genes, chromosomes and the principles of Mendelian inheritance;
- demonstrate a knowledge of the inheritance and underlying causes of genetic traits and diseases, including the interplay of genes and the environment.
- demonstrate an understanding of the techniques employed in genetic manipulation

## Student assessment

**There are two assignments associated with the unit and they are weighted equally:**

**Assignment 1:** An essay discussing the interaction between genes and the environment (2000-2,500 words). The precise title will be provided at the relevant day-school.

**Assignment 2:** An experimental write-up of the bacterial transformation practical session in a style suitable for an experimental report or paper. Example frameworks will be provided (1,000-1,500 words or equivalent).

All students are expected to upload their assignments into the VLE. Any assignments not suitable for uploading into the VLE will be clearly identified.

Closing date for the submission of assignments: **before 12 noon on Monday 24 June 2019 (BST)**

## Reading and resource list

AUTHOR	TITLE	PUBLISHER
Krebs, J <i>et al.</i> ,	Lewin's Essential Genes (3 <sup>rd</sup> Edition)	Garland Science, 2012
Krebs, J <i>et al.</i> ,	Lewin's Genes XII	Garland Science, 2018
Reich, David	Who we are and how we got here	OUP, 2018
Ridley, Matt	Nature via nurture: genes, experience and what makes us human	Harper Collins, 2004
Rutherford, Adam	A brief history of everyone who ever lived	Orion Publishing, 2016
Sapolsky, Robert	Behave: The Biology of Humans at Our Best and Worst	Vintage, 2018

## TIMETABLE

<b>Michaelmas 2018: DNA, the stuff our genes are made of</b>	
Day-school 1	13 October 2018
Day-school 2	20 October 2018
Day-school 3	3 November 2018
Day-school 4	10 November 2018
Day-school 5	24 November 2018
<b>Lent 2019: From genes to genomes</b>	
Day-school 1	19 January 2019
Day-school 2	26 January 2019
Day-school 3	2 February 2019
Day-school 4	16 March 2019
<b>Easter 2019: Genetics: past, present and future</b>	
Day-school 1	11 May 2019
Day-school 2	18 May 2019
Day-school 3	25 May 2019
Day-school 4	1 June 2019
Day-school 5	8 June 2019

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