



UNIVERSITY OF  
BIRMINGHAM

## Masterclass Programme 2017–18

Subject experts in action at the  
University of Birmingham!

‘The masterclass motivated  
me to do wider reading  
around my subject.’

*Student, ‘Drugs for Human Health’  
Pharmacy Masterclass*

Challenge what you know

## Business

### Taxing Our Wealth – Do We Have It Right?

In this masterclass we will be exploring together issues of wealth equality in Britain today. How unequal is our society? Should we care? Does it matter? Can anything be done about it even if it does matter? In particular, we will focus on the role taxation plays in affecting wealth equality. We will explore questions such as 'How does the UK tax system affect people's wealth in modern Britain?' 'Do we have the right mixes of taxes in the UK to create a fair system of contributions from everyone – rich and poor?' and 'What changes are being suggested to improve our tax system? Are they sensible?' Students should come along prepared to participate in the debate and offer opinions in what we hope will be an interesting and interactive session.

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Accounting and Finance
Year group	Year 12/13

## Engineering

### Biomedical Engineering: Accident and Emergency Engineering

This workshop will give you a taste of what it is like to be a biomedical engineer and design and make your own medical implant. A patient has broken the femur bone in one of their legs and been brought to A&E for help. Their X-rays show it is a nasty break and they are going to need surgery. The surgeon needs you, the engineers, to design and build a device which will hold the bone together whilst it heals. You will discover the science behind these amazing implants and how biomedical engineers help patients.

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Engineering
Year group	Year 10/11

### Sunny with a Mild Chance of Catastrophe

The impact of major space weather events is an active area of research and a topic of national interest. The potential damage of a solar superstorm to our economy, communications network and electricity grid is a real threat and must be taken seriously. Such storms can cause the loss of GPS (with many more consequences than just not being able to find the way to the supermarket), alter the orbits of satellites and could cripple the electricity grids around the world. This session will present an overview of the causes of space weather and the potential repercussions of a superstorm.

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Electronic, Electrical and Systems Engineering/Physics
Year group	Year 12/13

### Physics of a Car Crash

How do the police work out how fast a car was going when it started braking? Or what speed a car was travelling at when it hit a pedestrian? In a head-on collision, what difference does it make if you are in a heavier car or a lighter car? How are cars designed to protect their occupants in a crash? What about pedestrians and cyclists? Find out about the physics of a car crash, the engineering behind designing safer cars and why speed really does make a difference between life and death.

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Mechanical Engineering
Year group	Year 12/13

## Humanities

### American Studies: Understanding the 16th Street Baptist Church

On 15 September, 1963, a bomb exploded at the 16th Street Baptist Church Bombings in Birmingham, Alabama, killing four girls, and injuring numerous other people. With its large black congregation, the 16th Street Baptist Church served as a meeting place for civil rights leaders, including Martin Luther King, Jr., who called Birmingham a 'symbol of hardcore resistance to integration', particularly in light of Alabama's governor, George Wallace's ambition to preserve racial segregation in the state. Birmingham had one of the most violent and lawless chapters of the Ku Klux Klan, and the church bombing was the third in Birmingham in 11 days, following a federal order to integrate Alabama's school system.

This workshop will use a range of texts to broaden and deepen our understanding of the events of 15 September 1963 and its aftermath, thinking about the Civil Rights Movement, the South, the nature, form, and purpose of protest, the American dream, community vs. individual identity, and race relations in America since the 1960s. We will also think about the ways in which different kinds of text – songs, interviews, speeches, newspaper articles, images, and more – might be used in order to interpret, analyse, and write about both the present and the past.

Date	Wednesday 15 November 2017
Time	1.00–3.00pm
Subject area	American Studies/History
Year group	Year 12/13

### How to Read a Shakespeare Play

This session will provide an opportunity for English Literature A level students to see how the ways of reading and responding to Shakespeare that they are encountering are taken forward and developed in university-level study. Led by the Department of English Literature, this session will offer students a taste of the different ways in which Shakespeare is researched, taught and explored at university; it will offer a taste of different teaching and learning methods, via a mini-lecture and small group work. The session might be tailored to reflect particular plays studied by those students attending.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	English Literature
Year group	Year 12/13

### Making and Remaking Shakespeare

Shakespeare is often described as a genius... so it can come as a surprise to find him stealing words, phrases, plots and ideas from other people. This lecture will trace Shakespeare's borrowings back to all kinds of sources, from the Bible and the classics to contemporary plays, songs and sayings. We will discover how, when Shakespeare seems to be sticking most closely to his sources, he is often at his most creative, transforming them into something completely new – and we'll see how, in turn, Shakespeare's plays and poems become a creative resource for four centuries of writers and artists. This masterclass takes the form of a lecture followed by an optional Q&A session.

Date	Wednesday 1 November 2017
Time	1.00–2.30pm
Subject area	English Literature
Year group	Year 12/13

### Climate Change: Science, Impacts and Solutions

This class is designed to give a broad introduction to some key scientific ideas related to human-induced climate change, and will critically review the effectiveness of global attempts to restrict enhanced global warming to below 2 degrees Celsius.

Date	Wednesday 15 November 2017
Time	1.30–3.30pm
Subject area	Geography
Year group	Year 12/13

### Crime and Punishment in the United Kingdom

This StreetLaw session, led by students from our Pro Bono Group, will explore the history of crime and punishment in the United Kingdom and will also look at current approaches to these issues. Students will examine the social and political factors that influence approaches to punishment, and will consider how and why people should be punished for committing criminal offences.

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Law
Year group	Year 12/13

### Philharmonic Orchestra Workshop

Have you ever wondered how an orchestra works? What are all of those instruments and what do they all do? Is there a story behind the music? And why is there someone waving a stick?

The University of Birmingham Philharmonic Orchestra invites you to join us in our home the Elgar Concert Hall to answer these questions and more. We will take you on a musical journey, exploring a sample of the works from the BBC Ten Pieces project. You will get to experience the many sights and sounds of the orchestra and ensure that by the time you leave, you'll think about classical music in a whole new way.

Date	Wednesday 29 November 2017
Time	1.00–2.30pm
Subject area	Music
Year group	Year 8/9

### The Hard Problem of Consciousness: Can This Really Be a Physical Property?

Students will examine basic arguments around the subject of consciousness in detail. Students will then be divided into groups – membership determined by their emerging sympathies on the issue – and will undertake supervised critical discussions intended to identify possible weaknesses in the arguments, and ways in which they might be improved.

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Philosophy
Year group	Year 12/13



# Languages

## Try a New Language!

Why are languages useful for your future? In what ways could languages improve your employability or allow you to meet new people? What are the different ways to carry on with a language at university? Participants may be studying a modern language now, like French, German or Spanish, but Arabic, Chinese, Japanese, Italian, Portuguese or Russian are languages in demand and can be studied from scratch at university level. The masterclass allows students to try their hand at learning something new!

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 10

## Boost up your Languages!

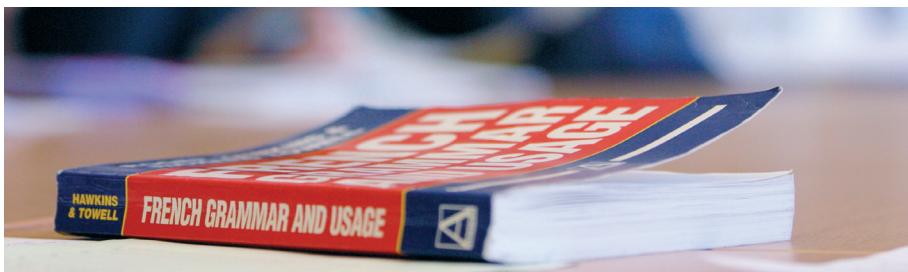
Some students find the gap between GCSE and A level a bit difficult. This masterclass will boost up Year 12 students language skills! In French, German or Spanish, these sessions will help students to understand and practise more grammar points or to help them expand and memorise vocabulary.

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 12 only

## Languages and Cultures

Are you passionate about cinema, literature, arts or history and the modern language you are currently studying? Participants will be introduced to topics linked to cinema, arts literature genres, authors, or history in the language they are studying. On the day, students will be split by language studied (French, German, Spanish and possibly Russian or Italian on request) and attend different interactive workshops where you will be able to practise your studied language in speaking and/or writing.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 12/13



# Mathematics

## Using Maths to Survive the Zombie Apocalypse

Understanding how an infection such as swine flu spreads through a population, or how different populations interact with each other, is essential to maintain healthy and diverse populations.

By describing these situations with maths, we can make predictions about what will happen when a particular treatment/containment strategy will be most effective. We will show students how to develop these mathematical models and look at ways to ensure the human race survives if (and when) the zombies attack!

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Mathematics
Year group	Year 12/13

## A History of Numbers with a View towards Computer Graphics

The concept of number is as old as human culture. We will take a hands-on trip through the various developments of number systems and, time permitting, will arrive at some surprising applications of 3D computer graphics.

Date	Wednesday 29 November 2017
Time	1.00–3.00pm
Subject area	Mathematics
Year group	Year 10/11

## Mathematical Analysis in Sport

Mathematics is an increasingly important tool in sporting analysis, and can be used to answer many interesting questions arising there. For example:

- Is there such a thing as 'form'?
- How likely is it that the winner of a competition is in fact the best player/team?
- When does it make sense to deliberately get yourself sent off?
- How closely is money linked to success?

This masterclass will showcase how mathematical techniques can be brought to bear on such questions.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Mathematics
Year group	Year 12/13

# Science

## Do We Need to Experiment on Animals?

Do you think that with all the scientific knowledge we now have, there is still a need to experiment on animals? Does information gained from animal research actually help us treat patients? Do scientists have the freedom to perform any experiment they think is interesting on an animal? This interactive masterclass will give students the opportunity to think about and discuss the issues involved in animal research. They will consider the ethics and law governing this area and will look at the medical and scientific developments, which have stemmed from work with animals.

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

## Interested in the Biochemistry of Life?

Why should one be interested in the Life Sciences at all? They give you the unique opportunity to grab part of the mystery of how life works on a molecular level. Moreover, students will learn to see patterns and repeating laws in nature.

Date	Wednesday 15 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

## Drugs for Human Health: Where Do They Come From?

In the last 100 years, the chances of a person living to 100-years-old has increased by about 40 times. At least part of the reason for this extended lifespan is the increased availability of effective drugs to treat human diseases. This session will consider where drugs originate from and how we can convert them into relatively safe and effective medicines using the combined skills of biologists, chemists, computational mathematicians and healthcare workers.

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13



### **Reading between the (Head)lines: How to Make Sense of Health Stories in the Media**

This session will explain concepts in health research and show you how you can use this knowledge to make sense of items we read in the news. We will use examples from everyday life to explain topics such as 'relative risk versus absolute risk', 'regression to the mean' and 'causation versus correlation' and demonstrate how you can use this knowledge to make sense of health stories in the media.

We will also discuss the issue of 'publication bias' and consider whether we actually do hear 'all' about it, or only the parts people want us to hear.

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

### **The Eye: Fact or Fiction?**

Can you really lose a contact lens behind your eyeball? Is sitting close to the television screen really bad for your eyes? Do babies see the world in black and white? Is it dangerous to sneeze with your eyes open? We will answer these questions and more as we explore common beliefs and myths about the human eye. This workshop will teach students about the eye and visual system by separating 'fact' from 'fiction': Learn about one of the most fascinating and important organs in the human body, and why you shouldn't always believe what you see on television!

Date	Wednesday 29 November 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

### **Monoclonal Antibodies as Anti-Cancer Drugs**

In this session we will cover the vaccination of mice with human proteins or tissues. We will look at how it is possible to select lymphocyte clones that produce mouse monoclonal antibodies (mAbs) for selected targets and engineer mouse mAbs to generate chimeric (mouse/human) and fully human mAbs as therapeutic drugs. By the end of this session you will learn how these drugs work (Mechanisms of action).

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

### Social Injustice is Killing on a Grand Scale

The quote from the title of this masterclass was taken from a World Health Organization document. Inequalities are a serious and well-recognised issue. In Birmingham for example, the poorest die ten years before the richest and whilst they are alive they spend more of their shorter lives in ill health. These inequalities are even greater across the globe. We will explore why this is the case, why it is not a natural 'survival of the fittest' phenomena, why we shouldn't be blaming the victims, why we all should be concerned (even the richest) and what the solutions are.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Public Health/Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

### Human Evolution: Who Do You Think You Are?

Meet the ancestors: introducing evolutionary trees and the major features of human evolution over the last 5 million years. You have dug up a set of bones in an African desert, but which species are they? They may represent an important link in human evolution, but are they nearer to the human or chimp branches of the evolutionary tree?

Date	Wednesday 29 November 2017
Time	1.00–3.00pm
Subject area	Biosciences
Year group	Year 12/13

### Spectroscopy

A session packed full of ideas and activities, during which students will learn about the key spectroscopic techniques used in chemistry and see the instruments in action. There will also be an opportunity to run your own spectra. Please note this session is for Year 13 students only.

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Chemistry
Year group	Year 13 only

### Particle Physics

This masterclass will aim to introduce students to the current view of particle physics and will cover what we think we are made of at a fundamental level. There will be some discussion of the evidence found so far to lead us to this view. There will also be some discussion of where the research is going now and in the future – what is happening at CERN and elsewhere? What are the big questions still to be answered?

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 12/13

### Rocket Science

The session will introduce the basic principles behind rocket launches – the forces involved in getting the rocket off the ground! Short videos will be used to show the recent history and possible future of space flight, as well as simple activities to illustrate the scale of the Universe. The students will design and build their own card/paper rockets. They will then be able to launch them, using a compressed air rocket launcher, and learn how to maximise the range or hit a target. Student helpers will be involved.

Date	Wednesday 15 November 2017
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 8

### Physics: Hot & Cold

The session will introduce students to the idea of temperature – our experience of extremes of temperature, what temperature means, and how is it different to heat. We will discuss what happens to materials when they get very hot or very cold, with lots of demonstrations using liquid Nitrogen. Superconductors will be introduced at a basic level. The students will each get an opportunity to solder together a circuit designed to warn if fridge temperature exceeds a certain level (40°C) and will be able to take the completed circuit away with them to test at home! Student helpers will be involved.

Date	Wednesday 29 November 2017
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 10

### Visual Perception and Illusions

We think that seeing is easy but about one-third of our brain is devoted just to vision. In fact visual perception turns out to be a complex task. This masterclass will look at visual processing for colour, motion, 3D, objects and faces and use visual illusions to show how the visual system can be tricked into seeing the wrong thing and how this helps us to understand how it works.

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Psychology
Year group	Year 12/13

**Sport and Exercise: Just Study It!**

This session will give an overview of the academic study of sport and exercise. The session will open with a general introduction to the area of teaching, detailing the subject area and its importance to the area of sport and exercise. The subject areas covered will include but not be restricted to: Sociology, Politics and Policy, Physiology, Psychology, Physiotherapy and Practical Studies.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Sport Science/Psychology/Physiotherapy
Year group	Year 12/13

## Social Science

**Fear Appeals: Can Teachers Scare their Students into Working Harder?**

Teachers often try to motivate students to work hard and prepare for important exams such as GCSEs and A levels. One way they do this is by reminding students of all the bad things that might happen to them if they fail their exams. For example, a teacher may say: 'If you fail your maths exam, you won't be able to get into a good college'. But is this actually an effective way to motivate students? In this masterclass we will look at whether students actually work harder when their teachers say these things, and the factors that might influence how effective these messages are.

Date	Wednesday 15 November 2017
Time	1.00–3.00pm
Subject area	Education
Year group	Year 12/13

**Life after Brexit: The Consequences of Leaving the European Union for the UK**

In June 2016 the UK decided to leave the European Union and now that 'Article 50' is triggered there will be a two-year period in which the conditions of exit will be negotiated. What does Brexit actually mean and what will the economic, social and political consequences be for the UK?

Date	Wednesday 1 November 2017
Time	1.00–3.00pm
Subject area	Political Science
Year group	Year 12/13

### **What Is Islamophobia and Why Is It a Problem?**

This masterclass will offer an introduction to the concept of Islamophobia and how it's manifested in contemporary society. Presented in an engaging way, the session will draw upon such issues as the media, mainstream politics and the far-right to pose a series of questions about why all forms of discrimination are unwanted and unfounded in today's Britain.

Date	Wednesday 8 November 2017
Time	1.00–3.00pm
Subject area	Social Policy
Year group	Year 12/13

### **Phantom Menace or Violent Criminals – are Young People Criminal or Poor?**

The media is often full of images and stories of anti-social youth, gang culture and 'chavs'. Are these young people a social menace or the product of the society in which we live? This session will start by exploring popular media images of young people and explore youth criminality in relation to wider social problems. This interactive lecture explores the context and causes of youth crime and questions some of the approaches governments adopt to solve it. Should we rely on imprisonment? What can education do to prevent criminal behaviour? Is this a problem of poverty or individual behaviour?

Date	Wednesday 22 November 2017
Time	1.00–3.00pm
Subject area	Social Policy/Criminology
Year group	Year 12/13



## Study skills

### Study Skills: Research and Evaluation Skills

This session will help students understand how to critically think and evaluate the material they are using for essays. It will also provide them with the skills to find good quality materials. This is a great starting point for students undertaking the EPQ.

Date	Wednesday 29 November 2017
Time	1.00–3.00pm
Subject area	Study Skills
Year group	Year 12/13

### Study Skills: Planning and Structuring an Assignment

This session will help students develop the key skills that are needed for successful planning and structuring of an assignment. This session is a good starting point for students who want to know more about academic writing or for those undertaking a longer essay, such as the EPQ, for the first time.

Date	Wednesday 6 December 2017
Time	1.00–3.00pm
Subject area	Study Skills
Year group	Year 12/13

## Masterclass information

- Are you a teacher in a state school or college?**
- Do you work with Year 8–13 learners?**
- Are you looking for opportunities for your widening participation/pupil premium cohort to experience learning in a Russell Group institution?**
- Do you want to ease your learners' transition between sixth form and university?**
- Would you like your learners' to learn how their current post-16 studies are developed at university, or discover new subjects they may be interested in studying?**

If so, then the University of Birmingham Masterclass programme is for you. Our masterclasses are designed to allow learners to experience what learning is like at a selective Russell Group university.

Most masterclasses are two hours long and are normally held in the Autumn Term between 1.00–3.00pm on a Wednesday afternoon.



### LEARN MORE

To find out more about our masterclass programme and to submit a booking request, please visit our website:  
[www.birmingham.ac.uk/masterclasses](http://www.birmingham.ac.uk/masterclasses)

To complete a booking request via our online booking form, you will need the following information at point of booking:

- Teacher name
- Contact email address
- Job title
- Name and address of school/college
- Contact telephone number
- Number of spaces desired

*Please only request spaces on a masterclass where a genuine interest has been expressed by a student. If a learner is requesting a space independently, they will need to provide the name and email address of a teacher who supports their booking request.*

**Schools and colleges should expect to hear by email whether their request has been successful.**

**Booking requests submitted by 22 September 2017**

Schools and colleges that have submitted applications by this date will be advised by 29 September 2017.

**Booking requests submitted after 22 September 2017**

The Masterclass team will aim to process all booking requests submitted after this date within ten working days of their submission.

## TERMS AND CONDITIONS

In sending us a booking request, you are automatically agreeing to the following terms and conditions:

- To brief all learners attending of their responsibility for their behaviour as well as the location of the masterclass
- To send us the names of students attending ASAP once booking is confirmed
- A minimum of 25 students is needed for a class to run (this may be from different schools)
- Priority will be given to those students currently under-represented in higher education
- All transport arrangements are the responsibility of the school/college and the University of Birmingham is unable to fund transport costs
- It is the responsibility of the school/college to ensure all necessary parental consent forms and permissions are obtained for the visit
- A booking request is not a guarantee of places

If you have a query regarding the masterclass programme, please contact the Masterclass team using the details below:

Email: [masterclass@contacts.bham.ac.uk](mailto:masterclass@contacts.bham.ac.uk)  
Tel: 0121 414 8489 or 0121 414 8332



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