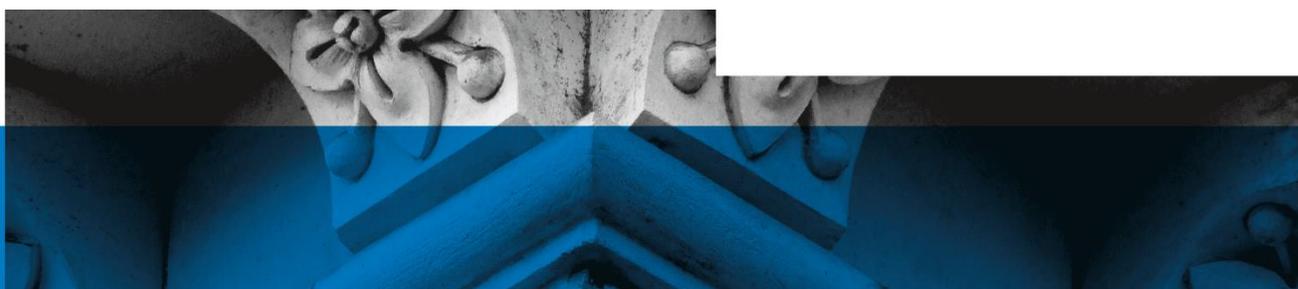


**DULWICH COLLEGE**  
FOUNDED 1619



## A Level Plus – Extension Courses

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Titles and Course Descriptors 2021



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## An Introduction to A Level Plus

We believe that there is much beyond your A level syllabuses that students at Dulwich should learn and understand. Therefore, in addition to your chosen A level subjects, all pupils will follow an A Level Plus programme in the Remove year. Students choose two courses over three terms (each course consisting of three lessons per fortnight), providing an opportunity for you to fire your enthusiasm and become experts in areas that lie just beyond the reach of the normal curriculum.

Yet A Level Plus is not simply divided into the same subjects as the A level timetable: the programme offers exciting, cross-curricular courses which frequently straddle multiple subject areas in their explorations of knowledge, culture and invention. They are unexamined, and their independence from defined syllabuses allows teachers' personal subject enthusiasms and expertise to connect with your own academic interests, stretching your intellectual horizons. The courses are varied, both in terms of their subject matter but also their outcome: some culminate in essay responses, whilst others invite you to produce mechanical, technological or cultural artefacts and, in some (such as the Weizmann Safecracking project) enter external competitions; all, though, are showcased in an evening in the Summer Term, in which each course opens its doors to parents, other students and staff, and in this you will present inventions, artefacts, experiments and mini-lectures which demonstrate your intellectual journeys over the period of the course.

### What's the difference between A Level Plus and Liberal Studies?

In the Remove, in addition to A Level Plus, you will take courses in Liberal Studies. The aim of the latter is *breadth*: Liberal Studies gives you the opportunity to take courses in which you may be interested, but which do not need to be 'connected' to your A levels.

A Level Plus, on the other hand, gives you *depth*: your choice of courses should complement your A level choices\* and *deepen* your knowledge beyond syllabuses, often to near-undergraduate standard. Frequently, courses are designed to introduce you to subjects you may want to study at university and the professions you might pursue afterwards, providing an opportunity to see how your chosen subject relates to the world at large.

Essentially, the aim of the course is to provide you with the opportunity to deepen your knowledge, discover if you really want to pursue a particular discipline beyond school, and also to prepare you well for the university application process.

*\*The exception is the Language courses: these are designed to accommodate both those students studying modern languages for A level and those who wish to study a language in addition to other, non-related, A level subjects.*

### How do I Choose?

Please submit online, your first and second choices for Cycles A and B, along with your three A level subjects, by 11.20am on **Friday 12 February 2021**. Cycle A will run from September 2021 to December 2021, and Cycle B will run from January 2022 until June 2022.



Rory Bryant  
Head of A Level Plus and EPQ

January 2021

## ART

| <b>Architectural and Interdisciplinary Studies, Cycle A <u>or</u> B</b> |  |
|---|--|
| Brief Course Description  | <p><b>'Over the years, in making art, I have constantly explored issues dealing with space, time, light, and society. I am particularly interested in how the light of a space determines how we see that space and similarly, in how light and colour are actually phenomena within us, within our own eyes.'</b> <i>Olafur Eliasson.</i></p> <p>Olafur Eliasson's practice engages the broader public through architectural projects and interventions in spaces, using Eliasson's approaches, this interdisciplinary course is aimed at students not only interested in the creative industry but also architecture, engineering and design. In this hands on making course students will learn traditional methods of architectural model-making as well as experimental and contemporary approaches to sculpture much like the artist Olafur Eliasson. Through a series of time based workshops students begin an understanding about what architecture is as a contemporary discipline which frequently overlaps with the sculpture world through its range of processes and ideas. In the final part of the course the students collaborate on a large scale installation that will be exhibited in one of the College's exhibition spaces.</p> |
| Acting as an extension to which A levels?                               | Art and Design and History of Art  |
| Preparation for which degree courses?                                   | Art College, Architecture, History of Art  |

| <b>Photography &amp; InDesign Studies – Investigating Digital Processes, Cycle A <u>or</u> B</b> |  |
|--|--|
| Brief Course Description   | <p>This course focuses on preparing boys for a career in the creative arts, to both enrich and complement cultural and creative pathways. Students who are interested in applying to architecture, art foundation courses, advertising and straight to arts degrees would benefit from the course, yet it would also be useful for those interesting in visual communication. Through a series of time-based workshops, students will learn how to use photography equipment to enhance the quality of their recording and their experimentation. This technical-skill-based workshop will then develop into Photoshop manipulation and the power this design tool can wield in manipulating imagery. Using their digital outcomes, boys will create 'magazine/book-ready' layout pages through a series of tutorials in InDesign. <i>(Maximum 8 due to equipment)</i></p> |
| Acting as an extension to which A levels?  | Art and Design and History of Art  |
| Preparation for which degree courses?  | Art College, Architecture, History of Art  |

## CRITICAL THINKING

| <b>Critical Thinking, Cycle B <u>only</u></b> |  |
|---|--|
| Brief Course Description                      | <p>Critical Thinking is the study of argument in the philosophical sense. That is, we aim to understand how to analyse, evaluate and deploy argument. The analysis of argument involves understanding its nature and various structures; the evaluation of argument requires us to identify flaws and weaknesses; the deployment of argument asks us to avoid the aforementioned weaknesses and to produce arguments that are both valid and sound.</p> <p>This course will be extremely useful for anyone interested in studying a discursive subject at university.</p> <p>The course is taught by two teachers. One of the sessions each fortnight will be a lecture on an important philosophical topic.</p> |
| Acting as an extension to which A levels?     | Classics, Economics, English, History, Philosophy, Psychology etc.   |
| Preparation for which degree courses?         | See above...   |

## ECONOMICS AND SOCIAL SCIENCES

| <b>Business Management and Enterprise, Cycle A or B</b> |   |
|---|---|
| Brief Course Description                                | Are you the next Steve Jobs? This course introduces students to the world of business, combining practical activities with theory to explore what it means to be an entrepreneur and run a business unit. It covers the role and importance of entrepreneurs in society, what makes for strong leadership and management, motivation theory, and also introduces key ideas in marketing and advertising, finance and strategy. Students will be expected to run their own (real or hypothetical) enterprise through modelling the decisions and activities of a real-world entrepreneur, and also consider the role of social enterprise and corporate social responsibility in the modern labour market. |
| Acting as an extension to which A levels?               | Economics, Design and Technology, Computing, Art, Theatre Studies; and open to any student interested in how to convert their passion for their work and skills into a profitable enterprise  |
| Preparation for which degree courses?                   | Any degree with Business, Economics or Management modules, or courses which develop skills for the workplace such as Design and the Arts, Marketing and Advertising; links to Psychology (management and motivation).   |

| <b>Finance, Cycle A or B</b>              |  |
|---|--|
| Brief Course Description                  | In this course students will learn about different types of financial markets and how they operate. London is, by some measures, the largest centre of Finance in the World, but the average Londoner can't tell the difference between a stock, a bond, or a share, let alone distinguish between a collateralised debt obligation and a credit default swap. The course will explore the operation of bond markets, stock markets, property markets, insurance markets and foreign exchange markets, before looking at the causes of the 2008 Global Financial Crisis. Students will also look at how Mathematics can be applied to other areas of Economics, such as looking at how indifference curves and isoquants can be used to explain consumer behaviour. This course will push learners well beyond the confines of the A level Economics syllabus, providing great preparation for studying the subject at university whilst also being fully accessible to those not studying Economics at A level. The course also provides a great opportunity to apply mathematics to economic issues. |
| Acting as an extension to which A levels? | Mathematics, Economics   |
| Preparation for which degree courses?     | Finance, Economics, Accounting   |

| <b>21st Century Geopolitics, Cycle A or B</b> |   |
|---|---|
| Brief Course Description                      | This interdisciplinary course analyses the role of the nation state in an increasingly globalised world. Exploring this complex topic from a geographical perspective, but touching on economics and politics, the global problems facing our world will be discussed. Issues such as global warming, population growth, mass migration and global ageing will increasingly affect us all: global problems which will require global solutions. Can the old world order come up with the necessary solutions? What role will nation states play and will we be able to move towards a form of global governance that overcomes national boundaries and self-interest? |
| Acting as an extension to which A levels?     | Geography/Social Sciences   |
| Preparation for which degree courses?         | Geography/Social Sciences   |

## LANGUAGES\*

| <b>Chinese HSK Exam Course, <i>must be chosen for both Cycles A and B</i></b>   |  |
|---|--|
| <i>(boys must complete the full academic year if they are going to be ready to apply for Confucius Institute scholarships.)</i> |  |
| Brief Course Description  | Chinese HSK Exam course. A Chinese language qualification promoted by the Chinese Government through its network of Confucius Institutes around the world.   |
| Acting as an extension to which A levels?   | Post Chinese GCSE and support for boys wishing to apply for Confucius Institute scholarships to study in China.  |
| Preparation for which degree courses?   | <ul style="list-style-type: none"> <li>- HSK Scholarship awards to study in Chinese Universities (1 semester or 2 semester language courses );</li> <li>- Single or joint language degree courses with Chinese. Although, HSK does not carry UCAS points, the exam qualifications are recognised by universities and many companies doing business with China around the world.</li> </ul> |

| <b>French DELF Certificate, <i>must be chosen for both Cycles A and B</i></b>                         |  |
|---|--|
| <i>(boys must complete the full academic year if they are going to be ready to pass the B2 exam.)</i> |  |
| Brief Course Description  | French DELF B2 Certificate   |
| Acting as an extension to which A levels?   | French A level   |
| Preparation for which degree courses?   | A French course that enables students to communicate authentically and independently in a wide range of contexts from the workplace to social interactions on a number of relevant, real-life subjects. You will also be able to negotiate, persuade and present hypothetical situations. You will gain a French DELF B2 Certificate by the end of the course, allowing you to opt into French modules at University and even alter your degree to Dual Honours (eg Politics and French). This certificate will also enable you to study at French universities and work / conduct business in France and/or any French-speaking country around the world. |

| <b>German for Goethezertifikat B2, <i>must be chosen for both Cycles A and B</i></b>       |   |
|--|---|
| <i>(boys must complete both to have a realistic chance of achieving the qualification)</i> |   |
| Brief Course Description   | We will study the required content to extend boys' Language knowledge to reach the B2 level and then enable them to take that examination – and if successful – have a highly coveted qualification on their CV. Students with little or no German can take either the A1 or A2 Goethezertifikat exam at the end of the course; students with a very high GCSE can do B1 or if exceptional B2 Goethezertifikat. Students who completed B1 in Y11 can move onto B2 Goethezertifikat. |
| Acting as an extension to which A levels?  | German A level  |
| Preparation for which degree courses?  | Any combination course a student wishes to study at university. While the Goethezertifikat does not contribute to UCAS, if a student presents a B2 certificate on arrival at University they may well be able to opt in to German modules and even alter their degrees to Dual Honours (i.e. History and German)  |

| <b>Spanish DELE Certificate, <i>must be chosen for <u>both</u> Cycles A <u>and</u> B</i></b> |  |
|--|--|
| Brief Course Description   | A Spanish language course that will combine everyday practical usage of the Spanish language with important topics relevant for the workplace. |
| Acting as an extension to which A levels?  | Post Spanish IGCSE and extension to first year A level.  |
| Preparation for which degree courses?  | Single or joint language degree. Joint Spanish and other discipline e.g. Spanish and History/English/another language.                         |

## LITERATURE, CULTURE, HUMANITIES

| <b>Classical Art and Architecture, Cycle A <u>only</u></b> |   |
|--|---|
| Brief Course Description                                   | The aesthetic values of the ancient world continue to inspire and inform to this day, and this course offers the opportunity to confront some of the most important and challenging aspects of ancient aesthetics. The course will explore: classical Greek sculpture and how it was received by Roman imitators; the evolution of Greek temple design, including the Parthenon and its surroundings; Pompeian frescoes and the interconnection of art and everyday life; and the regional responses to Greco-Roman culture through the lens of mosaic making in Britain and beyond. Students will also be able to study important periods of ancient history and mythology not otherwise touched upon in classical subjects. |
| Acting as an extension to which A levels?                  | Greek, Latin, Class Civ, Art, Art History, Philosophy, RT   |
| Preparation for which degree courses?                      | Classics, Art, History, Architecture  |

| <b>Comparative Mythology, Cycle B <u>only</u></b> |   |
|---|---|
| Brief Course Description                          | This course looks at how myths and legends are formed, change and are received over time by different cultures. In particular it will use comparison of mythemes from different cultures and periods to interrogate how myths construct, reinforce and destabilise the ideologies of their societies. Specific mythemes that will be looked at include creation myths (e.g. Aboriginal creation myths, Abrahamic religious traditions, Hindu traditions), myths of the apocalypse (floods, fires, comets, zombies), and folk tale figures such as the trickster and the femme fatale. We will look at retellings of myth through various media, from Aeschylus to Zefirelli, from oral poetry through to Marvel blockbusters. |
| Acting as an extension to which A levels?         | English, Greek, Latin, Religion and Theology  |
| Preparation for which degree courses?             | Anthropology, Classics, Drama, English, Psychology, Religion and Theology   |

| <b>Law, Cycle A <u>only</u></b>           |   |
|---|---|
| Brief Course Description                  | This course is aimed at both aspirant lawyers and those who wish to have a better understanding of the English legal system. We will cover: the development of the English legal system; differences between the English and the continental legal traditions, including a consideration of the adversarial and inquisitorial systems; criminal and civil law; the justice system; jurisprudence and theories of punishment; legal problems and critical thinking for lawyers. Wherever possible, we will approach topics through case studies and contemporary news stories to demonstrate the law's impact on our everyday lives. |
| Acting as an extension to which A levels? | Politics, History   |
| Preparation for which degree courses?     | Law, Politics, History  |

## Literature and Culture Decolonised: An Introductory Course, Cycle A *and* B

|   |  |
|---|--|
| Brief Course Description                  | <p>This interdisciplinary course aims to provide a rich and exciting introduction to postcolonial/ decolonial literature, history, and theory. It is essential study for any pupil invested in the project of decolonization or in British history, theory, journalism and literature approached from the unique perspective of the postcolonial. It invites pupils to consider a growing number of powerful counter-narratives to the dominant colonial narratives that have traditionally privileged the perspective of Western hegemonic cultures and assumed that colonised peoples have had no agency in the ways that colonial pasts are told in history, literature, journalism and film. By approaching colonial history from the perspective of language and identity, space and place, race and gender, and by attending to texts, films, journalism and cultural histories that have functioned and continue to function as unique sites of resistance to a narrative of colonial history that has remained predominantly white and male, the course aims to deconstruct this fragile narrative and to offer an alternative and far more enabling reading of cultural history.</p> <p>The course is organised over three blocks: the Black Atlantic, South East Asia, and Contemporary Britain and explores a range of novels, cultural histories, films, plays, poems and adaptations which together provide a rich introduction to a history of resistance, power, and struggle that has characterised the response of colonised and enslaved peoples to the phenomenon of Empire – a response that has shaped and continues to shape Contemporary Britain.</p> |
| Acting as an extension to which A levels? | English, History, Politics, Philosophy   |
| Preparation for which degree courses?     | English Literature, Cultural Studies, History, Sociology, Film Studies   |

## Make It New: The Birth of Modernism in 20<sup>th</sup> Century Europe, Cycle A *and* B

|                          |   |
|--------------------------|---|
| Brief Course Description | <p>This course will consider the form, context and development of modernism from the 1900s to the 1930s. Writing and art of the modernist period inhabits an atmosphere of crisis and fragmentation in the political world, the urban environment and in subatomic physics. We will examine the ways in which key thinkers, authors and artists of the period – Pablo Picasso, James Joyce, Ezra Pound, Katherine Mansfield, among them – questioned and ultimately transformed creative expression in response to the First World War, to scientific discovery, to mass media and publicity, to the speed and pace of transportation, to gender equality, to sexual liberty, and to emerging philosophical problems of mind and identity. Offering a highly integrated and multifaceted view of thought, culture and politics, the course will ask how, and why, modernism demands new ways of approaching people, time and space. What is the promise and predicament of being modern? Do questions that exercised modernists at the beginning of the twentieth century still have relevance for us at the beginning of the twenty first? If modernism involves a collapse of confidence in the nation state, in collective experience and in classical conceptions of mind and knowledge, then what are the knock-on effects of these sceptical drives? Key topics for discussion will include various forms of thought presentation (free indirect speech, interior monologue, stream of consciousness), censorship, montage, symbolism, sexual desire, maps and the city, utopias.</p> |
|--------------------------|---|

|   |   |
|---|---|
| Acting as an extension to which A levels? | English, French, History, Politics, Philosophy, History of Art, Music |
| Preparation for which degree courses?     | English, French, History & Politics, History of Art, Film Studies     |

### **Nazi Europe: from Occupation to Holocaust, Cycle A and/or B**

*(The course is different in Cycle A and Cycle B; it can be taken either as a full-year course, or in either Cycle A or Cycle B)*

|   |   |
|---|---|
| Brief Course Description                  | This course examines aspects of history of Nazi-occupied Europe. Focussing, in particular, on France and Greece, it explores experiences of defeat to Nazi forces, and examines a range of responses to Nazi occupation – from collaboration to resistance – situating these responses in their political, cultural, and ideological contexts. The course will also analyse the origins of the Holocaust, and the ways in which European states today reckon with their experiences of this period. We will read from recent works by leading historians (e.g. Robert Gildea’s <i>Fighters in the Shadows</i> ; Mark Mazower’s <i>Salonica: City of Ghosts</i> ), as well as engaging with the reflections of those who lived through this dark time (e.g. Marc Bloch’s <i>L’Étrange Défaite</i> ; Hannah Arendt’s <i>Origins of Totalitarianism</i> ). |
| Acting as an extension to which A levels? | History, Politics, English, Philosophy, Modern Languages (literature)   |
| Preparation for which degree courses?     | History, Politics, English, Philosophy, Modern Languages (literature)   |

### **Script to Screen, Cycle A or B**

|  |   |
|--|---|
| Course description                     | <p><b><i>‘Film is not a slice of life, but a piece of cake’</i></b> [Alfred Hitchcock]. Cinema has been the creative phenomenon of the 20<sup>th</sup> century. This course will look at directors that have been seminal in shaping modern cinema, and film scripts, woven with key film theory debates. It will also help to develop a critical understanding of film form and the function of film music and underscore. There will be the opportunity for practical application of ideas and techniques such as:</p> <ul style="list-style-type: none"> <li>• Creative adaptation and story-boarding, developing a narrative structure and character(s) – screenwriting: writing for an audience</li> <li>• Creating a short-list</li> <li>• Introduction to photography and camera work, shooting skills &amp; technology</li> <li>• Scoring and composition</li> <li>• Animation</li> <li>• Acting to camera</li> </ul> |
| Extension to A-levels                  | English Literature, Drama and Theatre, Music, History, Philosophy, Art  |
| Preparation for which degree subjects? | Film Studies, English Literature, Theatre Studies, Music, History, Classics, MFL, Liberal Arts, Creative Writing, Art, Art History, Media Studies   |

## **War, Cycle B only**

|  |  |
|--|--|
| Course description                     | This course will involve considerations of war from a variety of perspectives, using examples from classical antiquity to the present day. Topics will include the causes of wars; strategy (including logistics, propaganda and the Cold War); terrain and mapping; war, policy and nationhood; war and the law (including the rules of war and the Geneva Conventions); the ethics of war (just war theory, war crimes); the representation of war in art, film, literature and music; war and technology; terrorism, insurgency and counter-insurgency. |
| Extension to A-levels                  | Art History, Classical subjects, Economics, English, Geography, History, Philosophy, Politics. (There will also be information pertinent to each of the three Sciences.)   |
| Preparation for which degree subjects? | As above, but, in addition, Law, Psychology, War Studies.  |

## MUSIC

| <b>Music Production and Sound Cycle A or B</b> |   |
|--|---|
| Course description                             | Have you ever wanted to know why some music is louder than others? Or how to make a great recording from a garage? This course will be in two parts and will focus on key areas of sound and music production. The aim is to develop the necessary skills for the modern musician of all abilities who want to record. Part one will cover sequencing, sound design and synthesis. This will include realising a track from a sequencer and by understanding how a synthesiser works to create new sounds. Part two will develop an understanding of acoustics and sound, recording and production techniques. The course will conclude with a performance of your own sequenced track with a 'live' recorded track mixed in. |
| Extension to A-levels                          | Music, Computer Science   |
| Preparation for which degree subjects?         | Music, Music Technology   |

## SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

| <b>Abstract Problem Solving, Cycle A or B</b> |  |
|---|--|
| Brief Course Description                      | One part of the course will focus on combinatorics and discrete mathematics. Much of the focus will be on Graph Theory, the mathematical theory of networks and connections (not $y=x$ etc.) and will use them to explore other interesting topics including Markov Chains, the Probabilistic Method and Ramsey Theory. The second part of the course will study structures in abstract algebra through the Theory of Groups and Number Theory problems. The final part of the course will give an introduction to analysis, investigating concepts such as convergence, continuity, differentiability and the Riemann integral. Preparation for the British Mathematical Olympiad will also be given. |
| Acting as an extension to which A levels?     | Extends A levels in: Mathematics (pure)<br>Acts as a preparation for a degree in Mathematics   |
| Preparation for which degree courses?         | This course is suitable for those wishing to study mathematics at university but also those with the ability to look at abstraction with ease and can handle complex algebraic manipulation.   |

| <b>Advanced Synthetic Organic Chemistry, Cycle B only</b> |  |
|---|--|
| Brief Course Description                                  | This hands-on course will enable students to develop a range of practical procedures for the synthesis of solid and liquid organic compounds, including techniques of isolation, extraction and purification. Such techniques are widely used in organic chemistry in the preparation of materials, drugs and chemical feedstocks, and will provide a window into how chemistry is conducted in the "real world". The lesson material will neatly complement the Lent Term's A level Organic Chemistry content. <b>Participants must study A level Chemistry</b> |
| Acting as an extension to which A levels?                 | Chemistry, Biology   |
| Preparation for which degree courses?                     | Chemistry, Biochemistry, Biology and Medical Science   |

| <b>Astrophysics, Cycle A or B</b>         |  |
|---|--|
| Brief Course Description                  | This course focuses on our understanding of the heavens, how this has developed from early observational astronomy and the foundations of modern science, to the modern multi-wavelength approach which gives an increasingly sharp understanding of the universe around us. Working from the closest ranges to the deepest scales, we will focus on three key areas, the formation and discovery of planets (with their connection to life), the physics and lifecycles of stars and the cosmological models of the universe. As part of these themes, we will explore the very latest work astronomers and planetary scientists continue to develop. |
| Acting as an extension to which A levels? | Physics, Mathematics   |
| Preparation for which degree courses?     | Physics, Astrophysics  |

### Atoms and Molecules: How Experiment Leads to Theory, Cycle A only

|   |  |
|---|--|
| Brief Course Description                  | This very academic course will deepen students' understanding of atoms, molecules and lattices at a very fundamental level. The course is designed to neatly complement the A level Chemistry specification in the Michaelmas Term. For example, when atomic structure is studied in A level lessons, we will examine the nature and duality of electrons, their quantisation and their behaviour. When bonding is studied in A level lessons, we will introduce molecular orbital theory and hybridisation to build a more sophisticated understanding of these concepts. A diverse range of other topics will be touched upon, such as thermodynamics, kinetics and biochemistry. Throughout the course, hand-on experiments will be used regularly to bring these concepts to life. <b>Participants must study A level Chemistry.</b> |
| Acting as an extension to which A levels? | Chemistry, Biology   |
| Preparation for which degree courses?     | Chemistry, Biochemistry, Biology and Medical Sciences  |

### Engineering, Cycle A or B

|   |   |
|---|---|
| Brief Course Description                  | The course aims to give a flavour of what the first year of an undergraduate engineering degree may look like. The focus during the first part of the course will be on statics and mechanics, taking some of what the students have studied (or will study) during their Physics A-Level and applying it to solve complex structural problems. Alongside this the course will also look at properties of common engineering materials and how they are used in engineering design. Later the course will look at some introductory level fluid mechanics, and possibly some geotechnics. The course will culminate in a research project, in which the boys will be asked to research and then present on a specific engineering development/project (to be selected from a list of titles provided by ADI and ALK). |
| Acting as an extension to which A levels? | Physics and Mathematics   |
| Preparation for which degree courses?     | Engineering and other Physics-based courses   |

### Insights into the Learning Brain: Practical Psychology in the Classroom, Cycle A and/or Cycle B

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|--------------------------|---|
| Brief Course Description | Have you wondered why some things are easy for you to learn and others hard? Is it genetic or due to the learning environment? How does the brain process new information and why is it so hard to unlearn mistakes? What makes a good learner? Education psychologists have been asking themselves these questions for decades. You're a pupil, in a school, learning stuff so you have the ideal context to explore this further. This course will teach you the research methods required to set up an experimental project. We also have seven state-of-the-art wireless EEG (electroencephalogram) neuroimaging headsets. In addition to recording brain activity, they can be used for Brain-Computer Interfacing and neuro-feedback (brain training). They can even be used to control a drone using just your thoughts. Learn how to use these devices and, if you wish, how to include them in your research. Past projects include whether pupils learn better listening to music, whether playing computer games makes you more aggressive, and whether a task is learnt best if repeated or made harder. If completed, these projects can be used as a Crest Award. |
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|   | You'll get the most out of this course if you are self-motivated, organised and curious about how your mind works. |
| Acting as an extension to which A levels? | Biology, Chemistry, Philosophy   |
| Preparation for which degree courses?     | Experimental Psychology, Biology, Human Sciences, HSPS (Cambridge)   |

| <b>Online Commercial IT Systems Development, <i>Cycle A or B</i></b> |  |
|--|--|
| Brief Course Description   | In a world driven by the internet where commercial activity predominantly takes place online it is an essential skill to be able to develop IT business systems using the latest commercial platforms. In order to do this one must have web design skills (HTML, CSS, Bootstrap JavaScript), programming skills (Python) and database skills (noSQL, SQL).<br>These components are all brought together in this course where students will put together websites using the flask-python framework as employed by Netflix, Samsung etc. This platform underpins development frameworks such as Django. |
| Acting as an extension to which A levels?                            | Physics, Maths, Economics, Computer Science  |
| Preparation for which degree courses?                                | Computer Science, Physics, Maths, Business Artificial Intelligence, Computer Gaming and general digital skills for life beyond university.   |

| <b>Quantum Theory, <i>Cycle B only</i></b> |   |
|--|---|
| Brief Course Description                   | This course introduces some key ideas of Quantum Physics, with some of the mathematics that is necessary to understand the theory. It will cover the foundations of Quantum Mechanics, such as the concept of a wave-function, Schrodinger's Equation and Heisenberg's uncertainty principle, including apparent paradoxes like the Schrodinger's cat and the possible interpretations of Quantum Mechanics. Spin will be studied as a simple example of wave-functions, including some counterintuitive applications like quantum entanglement and quantum teleportation. A brief introduction to Relativistic Quantum Mechanics and Quantum Field Theory will also be provided. |
| Acting as an extension to which A levels?  | Physics, Maths and Chemistry  |
| Preparation for which degree courses?      | Physics and Maths   |

| <b>Relativity, <i>Cycle A only</i></b> |   |
|--|---|
| Brief Course Description               | This course introduces some key ideas of Einstein's Special and General Theories of Relativity, with some of the mathematics that is necessary to understand the theories. It covers how space and time change in relation to different observers in Special Relativity, including time dilation, length contraction and apparent paradoxes. It also touches on relativistic dynamics, including momentum, relativistic mass and the equivalence between mass and energy. In General Relativity, the equivalence principle, the curvature of space-time and blackholes will be discussed. |

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| Acting as an extension to which A levels? | Physics and Maths |
| Preparation for which degree courses?     | Physics and Maths |

**Weizmann Safe-Cracking: Engineering Projects, *must be chosen for both Cycles A and B***

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| Brief Course Description                  | Weizmann Safecracking – The aim of this course is to design and construct up to two entries for the Weizmann UK Safecracking competition. The “safes” are actually puzzle boxes based on Physics principles, and during the competition opposing teams will attempt to “crack” your safe by solving the puzzles. At the same time you will attempt to crack in to their safes. Teams that place in the top three win a place at the international competition in Israel, along with a grant to cover the majority of the expenses. The level of the Physics involved is often very advanced, and entrants should ideally be studying A level Physics. Experience in DT is very useful, as is some ability in coding. |
| Acting as an extension to which A levels? | Physics, Design Technology, Mathematics  |
| Preparation for which degree courses?     | Engineering, Physics, Design, Electronics, Mathematics   |

## SPORTS SCIENCE

| <b>Strength and Conditioning, Cycle A or B</b> |  |
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| Brief Course Description                       | <p><b>Practical Techniques in Strength &amp; Conditioning</b> This module is designed to help students understand and critically evaluate the technical aspects of, and rationale for, the principal techniques used in strength and conditioning. In addition students will reflect on aspects of their own technique.</p> <p><b>Biomechanics &amp; Skill Acquisition</b> The aim of this module is for students to critically evaluate the application of biomechanical and skill acquisition principles to strength and conditioning practice.</p> <p><b>Physiology of Training</b> Provide the student with theoretical knowledge and understanding of the physiological consequences of athletic training and how this information may be applied to enhance specific performance characteristics.</p> <p><b>Programme Design, Planning &amp; Monitoring</b> This module will critically evaluate the principal issues in designing and monitoring strength and conditioning programmes for enhancement of sports performance. This includes a multidisciplinary approach to programme design and evaluation.</p> |
| Acting as an extension to which A levels?      | Biology, PE  |
| Preparation for which degree courses?          | Sports Science, Biology  |