<table>
<tr><th colspan="2">Key Stage 5 (12)</th></tr>
<tr><td colspan="2">Course title: Physics A-Level</td></tr>
<tr><td colspan="2">Exam board: OCR A</td></tr>
<tr><td colspan="2">Specification code: H556</td></tr>
<tr><td rowspan="2">Autumn 1 (September – October)</td><td>Teacher 1: Practical Skills
Practical skills are a vital part of the Physics A-Level and a solid introduction from the start is beneficial. Students will learn how to:
plan investigations,
design methods to collect accurate data,
use equipment such as micrometers and digital multimeters
present data according to conventions
analyse data graphically
evaluate methods and data (including uncertainty).</td></tr>
<tr><td>Teacher 2: Mechanics: Scalars & Vectors, Energy and SUVAT
A good understanding of vectors and scale diagrams is essential to the whole Mechanics topic so is introduced at the very start. These skills will be employed and revisited throughout A-Level.

Work and energy is a fundamental concept in physics and this is a nice introduction to A-Level Mechanics as it builds on what has been studied at GCSE and requires low level maths skills.

Motion graphs are familiar from GCSE, but the derivations take it up to A-Level standard.</td></tr>
<tr><td rowspan="2">Autumn 2 (October – December)</td><td>Teacher 1: Electricity
Students studied electricity at GCSE so are reminded of the basics and use analogies to deepen their understanding.

They then develop their knowledge with A-Level concepts such as calculations of resistors in parallel, the electron-Volt, internal resistance and potential dividers. The practical skills from the first half term are well employed in this topic.</td></tr>
<tr><td>Teacher 2: Mechanics: Projectiles, Newton’s Laws and Momentum
Projectiles develop students’ understanding of SUVAT by looking at two-dimensional motion. Newton’s Laws are recapped from GCSE (and will be revisited later on in year 12) and more challenging ideas about Momentum are introduced, such as elastic and inelastic collisions.</td></tr>
<tr><td>Spring 1 (January – February)</td><td>Teacher 1: Waves
Waves is more conceptually demanding, so students will start with a recap of wave properties from GCSE, but will quickly develop their knowledge to include polarisation, interference and standing waves. These topics are more demanding mathematically and practically.

Introduces Young Double slit and diffraction gratings, as well as applying higher level maths to ideas about refraction from GCSE.</td></tr>
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	Teacher 2: Mechanics: More on Newton's Laws and Momentum Having studied the basic concepts in the autumn term, students will spend this time looking at more complex examples in context.
Spring 2 (February – March)	**Teacher 1: Quantum Physics** Quantum Physics is the first topic at A-Level that introduces something students are not familiar with from GCSE, so it is best taught at the end of key stage 5 (year 12). Students will look at the quantisation of energy and Einstein's photoelectric effect experiment as evidence of the particle model of light. They will go on to look at the wave model of particles and will discover that classical physics is unable to fully explain the behaviour of quantum-scale objects.
	Teacher 2: Mechanics - Materials In this topic students investigate the effect of forces on materials, building on what they have studied in mechanics and their applying their well-developed practical skills to determine the Youngs Modulus of a metal. The practical work on springs will be revisited in the further mechanics module.
Summer 1 (April – June)	**Teacher 1: Consolidation** Required practical catch up and consolidation for AS practice assessment.
	Teacher 2: Consolidation Required practical catch up and consolidation for AS practice assessment.
Summer 2 (June – July)	**Teacher 1: Thermal Physics** Students have studied kinetic theory, SHC and gases in both physics and chemistry GCSE so this topic builds on that. Students also taking A-Level chemistry will have studied gas laws in key stage 5 (year 12). This is a concrete topic, with lots of practical work to give students confidence as they start key stage 5 (year 13), which then develops to include complex derivations of rms speed equation.
	Teacher 2: Gravitational fields Gravitation is the most straightforward fields topic so comes first in the key stage 5 (year 13) sequence. It uses knowledge from the key stage 4 (year 11) Forces topic and builds to some complex derivations of Kepler's 3rd Law. It also fits well before circular motion so that students have a concrete example to base their understanding on.

Key Stage 5 (13)	
Course title: Physics A-Level	
Exam board: OCR B (from 2023-2024)	
Specification code: H556	
Autumn 1 (September – October)	**Teacher 1: Circular motion** This topic builds on work done in key stage **4 (**year 11) Forces and Space topics and is ideally placed after students have studied Newton's Laws of Gravitation so that they can apply that equation to the simple concept of planetary motion. The mathematical and conceptual demands grow, as the angle unit, radian is introduced and students are expected to work from first principles to evaluate the forces contributing to the centripetal force.
	Teacher 2: Astrophysics Perfectly placed after students have studied gravitational fields at the start of key stage 5 **(**year 13) and Waves & photons. Students will study the forces involved in star life cycles, building on GCSE knowledge (or year 9 for combined science GCSE students). They will then apply their knowledge of EM waves and photons to learn about the spectral analysis of radiation emitted from stars. In Cosmology they will further their understanding of red-shift (or be introduced to it for combined science students) and consider the evolution of the universe.
Autumn 2 (October – December)	**Teacher 1: Oscillations** Students will compare the motion of a mass in a circle from the previous topic with the linear movement of an object oscillating in SHM. The mathematical demands are high, and students will look at sinusoidal relationships and use trigonometry and differentiation to derive equations.
	Teacher 2: Electric fields Students will look for similarities and differences between electric fields and gravitational fields and learn about uniform and radial electric fields. This is put before capacitors to provide a good foundation of the principles.
Spring 1 (January – February)	**Teacher 1: Nuclear and particle physics** This topic starts by recapping atomic structure, covered in key stage 4 **(**year 10) physics and chemistry, adding in new knowledge of the SNF and calculations of nuclear radius and density. Students then delve deeper into the particle model learning about antimatter, quarks and leptons, the conservation of charge in particle decay and the role of the weak nuclear force. Radioactivity builds on GCSE knowledge and is taught alongside capacitors to reinforce the exponential relationship. Students then look at mass-energy and are introduced to Einstein's famous equation.

	Teacher 2: Capacitors Capacitors is taught after electric fields as an understanding of the electric field between the plates is important. Students will be studying the exponential relationship of capacitor charging and discharging alongside the exponential decay of radioactive sources.
Spring 2 (February – March)	**Teacher 1: Medical imaging** In this topic, students will apply their knowledge of particles, radioactivity, waves and their understanding of mathematical relationships such as exponential decay to x-rays, the gamma camera and ultrasound.
	Teacher 2: Electromagnetism This must be taught after forces and electric fields. Conceptually this is a challenging topic, so completing this last, makes perfect sense. Students have studied the basics at GCSE (apart from in combined science) and this builds on that taking their understanding to a much deeper level.
Summer 1 (April – June)	**Teacher 1: Consolidation** This time is spent bringing together all knowledge to tackle synoptic style exam questions. Time will also be spent studying the practical skills and developing exam technique.
	Teacher 2: Consolidation This time is spent bringing together all knowledge to tackle synoptic style exam questions. Time will also be spent studying the practical skills and developing exam technique.
Summer 2 (June – July)	**Teacher 1: EXAMS**
	Teacher 2: EXAMS