



Sir John Cass Red Coat School Programme of Study – Key Stage 5

Subject: **Physics**

Year 12	Year 13
<p><u>Topics Covered/ Areas of Focus:</u></p> <ul style="list-style-type: none"> • Module 1: Working as a Physicist • Module 2: Mechanics • Module 3: Electric circuits • Module 4: Materials • Module 5: Waves and particle nature of light 	<p><u>Topics Covered/ Areas of Focus:</u></p> <ul style="list-style-type: none"> • Module 6: Further Mechanics • Module 7: Electric and magnetic fields • Module 8: Nuclear and particle Physics • Module 9: Thermodynamics • Module 10: Space • Module 11: Nuclear Radiation • Module 12: Gravitational fields • Module 13: Oscillations
<p><u>Skills Development & Expected Progress:</u></p> <p>In recent years, higher education institutions and employers have consistently flagged the need for students to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work. The A-Level Physics course supports this need by developing the following transferable skills:</p> <p>Cognitive skills</p> <ul style="list-style-type: none"> • Non-routine problem solving • Systems thinking – decision making and reasoning. • Critical thinking • ICT literacy <p>Interpersonal skills</p> <ul style="list-style-type: none"> • Communication • Relationship-building skills • Collaborative problem solving • Adaptability • Self-management and self-development 	<p><u>Skills Development & Expected Progress:</u></p> <p>The course continues to develop the skills built during Yr12:</p> <p>Cognitive skills</p> <ul style="list-style-type: none"> • Non-routine problem solving • Systems thinking – decision making and reasoning. • Critical thinking • ICT literacy <p>Interpersonal skills</p> <ul style="list-style-type: none"> • Communication • Relationship-building skills • Collaborative problem solving • Adaptability • Self-management and self-development

<p>Pupils must meet or exceed their minimum target grades in the End-of-Year 1 Exam in order to progress to Year 13.</p>	
<p><u>Assessment:</u></p> <p>There is regular assessment to determine progress in accordance with the school policy</p> <p>Internal Assessment: Assessed Homework (weekly), End-of-Chapter Tests, End-of-Module Tests and End-of-Year 1 Exam (essential prerequisite for progression to Year 13 is for pupils to achieve their Minimum Target Grade).</p> <p>Practical Endorsement: Candidates complete a minimum of 16 practical activities to demonstrate practical competence (over Year 1 and 2 of the A Level course).</p> <p>External Assessment:</p> <p>New A Levels will be fully linear so assessment of a students' knowledge and understanding of the whole course takes place at the end of two years of study (end of Year 13).</p>	<p><u>Assessment:</u></p> <p>There is regular assessment to determine progress in accordance with the school policy</p> <p>Internal Assessment: Assessed Homework (weekly), End-of-Chapter Tests, End-of-Module Tests and End-of-Year Mock Exams (essential prerequisite for External Exam Entry is for pupils to achieve their Minimum Target Grade).</p> <p>Since the course is fully linear, all examinations take place at the end of Yr 13 as outlined below:</p> <p>Paper 1: Advanced Physics I</p> <p>Availability: May/June First assessment: 2017 30% of the total qualification</p> <ul style="list-style-type: none"> • Assessment is 1 hour 45 minutes. • The paper consists of 90 marks. • The paper may include multiple-choice, short open, open-response, calculations and extended writing questions. • Questions assessing use of mathematics skills will make up to 40% of the exam paper. <p>Topics included in the paper:</p> <ul style="list-style-type: none"> • Working as a Physicist • Mechanics • Electric circuits • Further Mechanics • Electric and Magnetic fields • Nuclear and Particle Physics

Paper 2: Advanced Physics II

Availability: May/June

First assessment: 2017

30% of the total qualification

- Assessment is 1 hour 45 minutes.
- The paper consists of 90 marks.
- The paper may include multiple-choice, short open, open-response, calculations and extended writing questions.
- Questions assessing use of mathematics skills will make up to 40% of the exam paper.

Topics included in the paper:

- Working as a Physicist
- Materials
- Waves and the Particle Nature of light
- Thermodynamics
- Space
- Nuclear Radiation
- Gravitational Fields
- Oscillations

Paper 3: General and Practical Principles in Physics (synoptic paper)

Availability: May/June

First assessment: 2017

40% of the total qualification

- Assessment is 2 hour 30 minutes.
- The paper consists of 120 marks.
- All topics covered across the full A level Specification.
- Half the paper will focus on testing students' knowledge and understanding

	<p>of practical skills and techniques.</p> <p>Science Practical Endorsement</p> <p>Internally assessed and externally moderated by Pearson Edexcel. Availability: May/June First assessment: 2017</p> <p>Performance will be assessed by teachers against common assessment criteria that is consistent across exam boards.</p>
<p><u>Literacy:</u></p> <p>Students will be required to access, manage, integrate, evaluate, construct and communicate information and ideas during writing of practical reports. Marks are awarded in extended questions during exams for logical presentation of information and ideas.</p>	<p><u>Literacy:</u></p> <p>Students will be required to access, manage, integrate, evaluate, construct and communicate information and ideas during writing of practical reports. Marks are awarded in extended questions during exams for logical presentation of information and ideas.</p>
<p><u>Numeracy:</u></p> <p>Mathematical skills make up 40% of all assessment during the A level course.</p> <p>These include:</p> <ul style="list-style-type: none"> • Use and analysis of Base units. • Use of standard form, ratios, fractions and decimals • Estimations. • Calculation uncertainties, significant figures, orders of magnitude. • Solving and rearranging equations, including quadratic equations. • Recognising, plotting and using linear and non-linear graphs with calculation. • Calculation of areas and volumes. • Use of trigonometric identities, resultant vectors. • Use of degrees and radians, small angle approximations. 	<p><u>Numeracy:</u></p> <p>Mathematical skills make up to 40% of all assessment during the A level course.</p> <p>These include:</p> <ul style="list-style-type: none"> • Recognising, plotting and analysing graphs with 2 variables including logarithmic functions. • Algebra/ solving equations/ re-arranging formulas • Standard form, percentage, decimal, fractions and using ratios. • Geometry and trigonometry- calculating the circumferences, surface areas and volumes of regular shapes. • logarithmic functions • Constructing and interpreting frequency tables and diagrams, bar charts and histograms. • Data handling.

<p><u>ICT:</u></p> <p>Presentations, animations, access, manage, integrate, evaluate, construct and communicate</p>	<p><u>ICT:</u></p> <p>Presentations, animations, access, manage, integrate, evaluate, construct and communicate</p>
<p><u>Life in Modern Britain:</u></p> <p>Pupils will develop the deep understanding of their subject that will prepare them for life in modern Britain. Willingness to participate in group discussions and class debates will be encouraged from the outset. Respecting the views of others and showing tolerance through group work and presentations. Nominating group leaders and respecting democratic values are just some of the British values that will be actively reinforced. All lessons promote independent learning, facilitating pupils to become independent enquirers with advice and encouragement to read around their subject and go beyond the scope of the syllabus. Question answering periods and class discussions promote respectful dialogue. This will prepare students for employment and provide opportunities in industry to apply these skills such as technician roles and quality control and for further education.</p>	
<p><u>SMSC:</u></p> <p>Spiritual, moral, social and cultural aspects of the Physics syllabus are developed throughout the course. For example, physical properties of materials and how they can be developed to minimise environmental damage are studied. The wonder of the Universe and its many mysteries is something that cannot fail to engage and amaze students, likewise developments in particle physics, and the implications of quantum mechanics are far-reaching and perplexing. Cultural aspects look at the contribution of scientists throughout history from around the world. Social skills are developed through group work, cooperating well with others and showing respect for the views of their peers.</p>	
<p><u>Meeting the needs of individual students & Additional Support:</u></p> <p>Extension class, one-to-one sessions with academic tutors.</p>	
<p><u>Extra-Curricular Activities & Club:</u></p> <p>Extension classes Saturday booster sessions Lecture at imperial college London, UCL, Kings college London. London (POTMED workshop). Opportunities at Eton College.</p>	
<p><u>Independent Study/ Homework:</u></p> <p>Throughout the course, students are expected to undertake a minimum of 5 hours homework every week. Students are also expected to work independently from a number of texts.</p>	

Resources for Learning Support and VLE:**Recommended Reference Books (provided by school)**

Advanced Physics for You by Keith Johnson

Edexcel A level Physics student book 1 by Mike Benn & Graham George

Edexcel A level Physics student book 2 by Mike Benn & Graham George

Other recommended texts for independent study**General text books (recommended)**

A Level Physics by Roger Muncaster

Advanced Physics Fifth Edition by Tom Duncan

Advanced Physics Second Edition (Advanced Sciences) by Steve Adams and Jonathan Allday

Edexcel AS/A level Physics student book 1 by Miles Hudson

Edexcel AS/A level Physics student book 2 by Miles Hudson

Useful websites

There are a number of useful study and revision websites which are frequently updated and increased. A list of some useful and interesting sites follows:

Physics study/revision:

www.examstutor.com

www.cyberphysics.co.uk

www.s-cool.co.uk

www.tap.iop.org

www.phet.colorado.edu

www.science.howstuffworks.com/physical-science-channel.htm

veritasium youtube channel

Physics News:

www.physlink.com/index.cfm

www.physicsworld.com