A-level Physics Course Information

Course Overview

- **Exam Board** – AQA
- **Usual Age Range** – 16 to 19
- **Qualification** – One A-level
- **Curriculum Time** – Five 50-minute lessons per week in class plus work in Independent Learning Time
- **Assessment** – Three 2-hour examinations taken at the end of the two-year course
- **Grading** – Reformed six-point A-level scale of A*, A, B, C, D, E.
- **Full specification** - https://filestore.aqa.org.uk/resources/physics/specifications/AQA-7407-7408-SP-2015.PDF

Curriculum Intent

The **intent** of A-level Physics is to give UTC students an opportunity to build on their GCSE studies to develop a broad understanding of the content within the following seven fundamental areas that are further split into topics and to be able to apply this understanding to explain physical phenomena:

- Particles and radiation
- Waves and optics
- Mechanics and materials
- Electricity
- Further mechanics and thermal physics
- Fields
- Nuclear physics

In addition to learning the content in each topic at A-level the intention is to learn how to draw together different areas of knowledge and understanding within answers to questions. This breadth is assessed in the third examination paper.

At the UTC we specifically intend students to appreciate the subject's relevance to the world of work, in particular healthcare science. Healthcare science **careers** are explicitly taught within relevant topics in the A-level Physics sequence of learning. Students will also have direct first-hand experience of our healthcare science partners through project days and other aspects of UTC life such as our extensive UTC extra programme. At this UTC the Medical Physics option is taught as part of the A-level Physics course. Students are taught the following six applications that apply the seven fundamental areas of physics previously taught in the course:

- Physics of the eye
- Physics of the ear
- Biological Measurement
- Non-ionising imaging
- X-ray imaging
- Radionuclide imaging and therapy

A variety of careers outside this specialism are also taught in appropriate topics. The intent is to motivate students to pursue further study in a physics related subject beyond A-level. Suggested **destinations** after completion of this course include progression onto courses such as medicine or medical physics. Some students aiming for such a course might choose to study Medical Science as a fourth subject alongside their three A-levels.

Throughout A-level Physics students are encouraged to develop their **literacy skills**. Students are regularly exposed to reading material in class and extended writing activities such as experimental write ups. Extended response questions allow students to demonstrate their ability to construct and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The physics literacy level of this course is not underestimated as all three examination papers assess long answer questions. Through the explicit teaching of specific physics key words as each topic is taught students demonstrate their understanding of a growing physics vocabulary building on what was taught at GCSE by carefully designed written tasks, as well as verbally through questioning techniques used by their teacher. This **love of reading** is further developed by both non-fiction and fiction physics related titles that have been carefully selected by their physics teachers that are available to borrow in our Learning Resource Centre. It is often found that by A-level the students are reading the same physics titles as their teachers and this passion is shared further through our UTC extra programme or through students choosing scientific titles in their Extended Project Qualification.

Like GCSE Physics, although to at least Higher GCSE Mathematics standard, the following five fundamental **numeracy** threads running through all A-level sciences are taught via the context of A-level Physics. These are reinforced further albeit through a complementary subject in A-level Chemistry and A-level Biology:

- Arithmetic and numerical computation
- Handling data
- Algebra
- Graphs
- Geometry and trigonometry

For example, students are taught how to calculate the rate of change from a graph showing a linear relationship. In A-level Biology they are taught to use a gradient to calculate the rate of transpiration. In A-level Chemistry a gradient could be used to calculate the rate constant of a zero-order reaction. Whilst in A-level Physics a gradient could be used to calculate the acceleration which is the rate if change of velocity. Our students are well prepared in physics numeracy as 30% of the marks in A-level Physics examinations now requires such a skill. Due to the significant amount of applied mathematical skill required in this science in particular a bespoke measurements and errors topic is taught at the start of the course. The additional study of A-level Mathematics alongside A-level Physics is highly recommended, but not essential.

The students at our UTC experience more than the twelve required practical activities that the examination board requires. At this UTC students achieve the practical endorsement so are well prepared for a destination that requires this as part of the admissions process. Students are engaged in physics because they have the opportunity to complete practical work.

Remote Learning and Revision

Students will benefit from additional study on-site and at home using their personal copy of their Oxford University Press Textbook provided by the UTC.

Students can communicate with the teacher via the message function on Teams if absent from school and well enough to do some work.

AQA Practice Papers - https://www.aqa.org.uk/subjects/science/as-and-a-level/physics-7407-7408/assessment-resources?f.Sub-category%7CF=Sample+papers+and+mark+schemes

Curriculum Overview

The learning in A-level Physics is sequenced as follows.

Note: the full Curriculum Plans are available on request to info@nef.tynecoast.academy

Revision Resources – Click on the following for links to your Kerboodle study guide

Year 12

0 Measurements and Errors

1 Matter & Radiation

2. Quarks & Leptons

3. Quantum Phenomena

4. Waves

5. Optics

6. Forces in equilibrium

7. On the move

8. Newton's laws of motion

9. Force and momentum

10. Work, energy, and power

11. Materials

12. Electric current

13. Direct current circuits

Year 13

17 Motion in a circle

18 Simple harmonic motion

19 Thermal physics

20 Gases

21 Gravitational fields

22 Electric fields

23 Capacitors

24 Magnetic fields

25 Electromagnetic induction

26 Radioactivity

[27 Nuclear energy]