Advanced Higher Physics

# Course Rationale

The advanced higher physics course has been designed to give a deeper insight into the structure of the subject by reinforcing and extending your knowledge and understanding of the concepts of physics from higher level and developing your skills in investigative practical work. The course seeks to illustrate and emphasise situations where the principles of physics are used and applied, linking theory and practice. An opportunity for engaging in some independent experimental research is also provided.

Pupils embarking on this course are expected to have gained a C pass or above at Higher Physics or equivalent.

# Course Content

# The course has four main areas of study:

**Rotational Motion and Astrophysics:** In this are you will learn about rotational motion and astrophysics. An astronomical perspective is developed through a study of gravitation, leading to work on general relativity and stellar physics. The unit concludes with a study of the properties and evolution of stars.

**Quanta and Waves:** In this area you will learn about quantum theory and waves. The unit introduces non-classical physics and includes the Uncertainty Principle and quantum tunnelling. The effects of cosmic radiation are considered, including the solar wind. The topic of simple harmonic motion gives an insight into the motion of vibrating objects, and this is followed by the development of a mathematical model of waves. The many phenomena associated with the interference of waves are studied and the unit concludes with a consideration of polarisation.

**Electromagnetism:** In this area you will learn about electromagnetism. The unit will develop your knowledge and understanding of electric and magnetic fields. You will study capacitors and inductors used in dc and ac circuits.

**Project -** You will have the opportunity to select a physics topic, plan and carry out investigative work and produce a report of your findings.

# Skills

Throughout the course you will have opportunity to develop your skills in numeracy and information handling, scientific literacy, and thinking skills such as analysing and evaluating.

You will gain additional experience in practical investigative work. Through the individual project you will develop your skills in planning, creativity, and problem solving as well as project-management and organisation.

# Course Assessment

The course assessment has two components: a question paper (75%) and the project report (25%). Both will be marked by the Scottish Qualifications Authority (SQA). The course assessment is graded A-D.

# Progression

The course will provide a suitable basis for further study in science, engineering, electronics, computing, design, architecture, mathematics or health and medicine courses. e.g. Higher National Diplomas (HNDs) or degree programmes. Advanced Higher Courses provide good preparation for learners progressing to further and higher education as learners doing Advanced Higher Courses must be able to work with more independence and less supervision. Advanced Higher Courses may also allow ‘advanced standing’ or partial credit towards the first year of study of a degree programme.

For other learners, progression will be directly to employment or work-based training programmes. Examples of employment opportunities and training programmes are careers in oil and gas exploration, construction, transport or telecommunications.

# Career Pathways

Engineer (Aerospace, Civil, Chemical, Electrical, Energy, Nuclear, marine, Sound, Structural, Telecoms, etc!)

Air Traffic Controller AR/VR programmer Naval architect Medical Physicist Materials Technician Meteorologist Oceanographer Pilot

Optometrist Prosthetist Quantity surveyor Veterinary surgeon