

8. Year 11 Subjects 2011 (Science)

VCE Physics

Physics is a theoretical and empirical science, which contributes to our understanding of the physical universe – from the minute building blocks of matter to the unimaginably broad expanses of the galaxies and beyond. The study of Physics, by increasing understanding of the physical and social environment, has led to developments that have profoundly influenced the world. This study covers the areas that traditionally are the basis of courses at this level, with an emphasis on the foundation areas of light, matter, mechanics and electricity. A contextual approach to the study has been adopted so that students appreciate the relevance of physics to the physical, technological and social worlds.

Unit 1: Nuclear physics and Radioactivity

Areas of Study:

This unit consists of three areas of study:

- *Area of Study 1: Nuclear and radioactivity physics* - The particle model of matter and ideas about energy transfers and transformations are relevant to the study of nuclear and radioactivity physics. Students' understanding of the particle model of matter, developed in earlier years, is extended to include subatomic particles. Ideas of energy transfer and transformations are applied to energy changes associated with nuclear phenomena and radioactivity and their applications. Students develop an ability to contribute to informed debate on the use of nuclear and radioactive technological applications in society. Students will use the particle and energy changes models of nuclear and radioactivity physics in the contexts of environmental radiation and the production and use of radioisotopes in industry. On completion of this unit the student should be able to describe the uses and effects of nuclear reactions and radioactivity in industry, the environment and the general community.
- *Area of Study 2: Electricity* - Students develop circuit models to analyse electrical phenomena and undertake practical investigations of circuit components. Concepts of electrical safety are developed through the study of safety mechanisms and the effect of current and time on humans. Mathematical models are applied and critically assessed during experimental investigation of DC circuits. Students will use electrical circuits in the contexts of simple battery operated DC devices, household electricity, and car electrical systems. On completion of this unit the student should be able to apply a basic DC circuit model to simple battery operated devices, car and household (AC) electrical systems; and describe the safe and effective use of electricity by individuals and the community.
- *Area of Study 3: Detailed Study* - Six detailed studies are available for selection in Unit 1. One detailed study is to be selected from:
 - ❖ Astronomy; Astrophysics; Energy from the nucleus; Investigations: Flight; Investigations: Sustainable energy sources; Medical physics.
 - ❖ The selected detailed study requires approximately 12 hours of class time.
- Note: The detailed study chosen in Unit 1 must be a different detailed study from that chosen in Unit 2.

8. Year 11 Subjects 2011 (Science)

VCE Physics (Cont...)

Assessment:

Unit 1 consists of two outcomes:

- Outcome 1 - Students should be able to explain and model relevant physics ideas to describe the sources and uses of nuclear reactions and radioactivity and their effects on living things, the environment and in industry.
- Outcome 2 - Students should be able to investigate and apply a basic DC circuit model to simple battery operated devices, car and household (AC) electrical systems, and describe the safe and effective use of electricity by individuals and the community.

Assessment Break-Down:

For this unit, students must complete the following:

- A practical investigation (student designed or adapted) AND
- a selection from the following:
 - ❖ an annotated folio of practical activities; a data analysis; a multimedia or web page presentation; a response to a media article; a summary report of selected practical investigations including maintenance of a logbook; a written report; a test (short answer and extended response).

8. Year 11 Subjects 2011 (Science)

VCE Physics (Cont...)

Unit 2: Physics

Areas of Study:

This unit consists of three areas of study:

- *Motion* - Students learn about the models used to explain movement from the early theories of Aristotle and the work of Galileo and Newton. These theories are developed through the examination of aspects of movement including transport, games and sport. All models are developed within contexts that are familiar and relevant to students. Ideas about energy transfers and transformations continue to be used. Mathematical models are critically applied during experimental investigation of examples of movement. Students will use the Newtonian model of movement in the contexts of the historical development of the physics of motion, transport, and games and sports. On completion of this unit the student should be able to describe and explain movement of particles and bodies in terms of Aristotelian, Galilean and Newtonian theories.
- *Wave-like properties of light* - A wave model is applied to light phenomena. Students will use the wave-like properties of light in the contexts of seeing with the unaided eye, extending visual and communication capabilities, and the use of optical instruments. On completion of this unit the student should be able to describe a wave model of energy transfer and apply it to light phenomena
- *A Detailed study* - Six detailed studies are available for selection in Unit 2. The detailed study chosen in Unit 2 must be a different detailed study from that chosen in Unit 1. One detailed study is to be selected from:
 - ❖ Astronomy; Astrophysics; Energy from the nucleus; Investigations: Flight; Investigations: Sustainable energy sources; Medical physics.
 - ❖ The selected detailed study requires approximately 12 hours of class time.

Assessment:

Unit 2 consists of two outcomes:

- Outcome 1 - Students should be able to investigate, analyse and mathematically model motion of particles and bodies in terms of Aristotelian, Galilean and Newtonian theories.
- Outcome 2 - Students should be able to describe and explain the wave model of light, compare it with the particle model of light and apply it to observed light phenomena in practical investigations.

8. Year 11 Subjects 2011 (Science)

VCE Physics (Cont...)

Assessment Break-Down:

For this unit, students must complete the following:

- A practical investigation (student designed, adapted or extended) AND
- a selection from the following:
 - ❖ an annotated folio of practical activities; a data analysis; a multimedia or web page presentation; a response to a media article; a summary report of selected practical investigations including maintenance of a logbook; a written report; a test (short answer and extended response).

(NOTE: At Alphington Grammar School Units 1 and 2 Physics are pre-requisites for Units 3 and 4 Physics)