Applied Science

BTEC Level 3 National Diploma

The science courses offered here at Health futures UTC are designed to offer academic and vocational experiences to prepare students for both higher education and health-centred careers. We also offer unique opportunities to work with local universities and health professionals as part of our contribution to the extra-curricular programme.

Course details:

Awarding body: Edexcel 2016 specification (720GLH)

Content:

The course consists of 8 units of which 6 are mandatory and 3 are external-assessed units.

- Mandatory content (83%).
- External assessment (58%).

Structure of the course

Unit 1: Principles and Applications of Science I – mandatory unit with external assessment

Scientists and technicians working in science and science-related organisations must have a good understanding of core science concepts. A strong grasp of these concepts will enable you to use and apply this knowledge and understanding in vocational contexts when studying other units within this qualification.

The topic areas covered in this unit include: animal and plant cells; tissues; atomic structure and bonding; chemical and physical properties of substances related to their uses; waves and their application in communications.

Unit 2: Practical Scientific Procedures and Techniques – mandatory unit with internal assessment

This unit introduces you to standard laboratory equipment and techniques, including titration, colorimetry, calorimetry, chromatography, calibration procedures and laboratory safety. Through the practical tasks in the unit, you will develop proficiency in the quantitative analytical techniques of titration and colorimetry, including learning to calculate the concentration of solutions. You will use measurement of temperature to study cooling curves

and be introduced to paper and thin-layer chromatography (TLC). You will also have the opportunity to calibrate equipment and will be encouraged to be aware of the safety aspects of given laboratory procedures and techniques.

Unit 3: Science Investigation Skills

In this unit, you will develop the essential skills underpinning practical scientific investigations. As well as drawing on Unit 1 and Unit 2, these skills will be delivered through subject themes ranging from enzymes and diffusion to electrical circuits. The subject themes provide different contexts for the development of the investigative skills. To complete the assessment task within this unit, you will need to draw on your learning from across your programme.

Science investigative skills will help you in many scientific or enquiry-based learning courses in higher education, as well as prepare you for employment in a science-related industry.

Unit 4: Laboratory Techniques and their Application – mandatory unit with internal assessment

In this unit, you will investigate a scientific organisation to gain an understanding of how it operates. You will investigate health and safety practices in the organisation's laboratories and consider related primary and secondary legislation. You will gain a valuable insight into the operation of the pharmaceutical and bulk chemistry industries by making and testing two organic compounds – a liquid and a solid – exploring how industrial production differs from the process that you carry out in the laboratory. You will also investigate the different methods for testing the purity of the products.

Unit 5: Principles and Applications of Science II – mandatory unit with external assessment

It is important that scientists and laboratory technicians are able to use and apply key science concepts to work efficiently and effectively in science and science-related organisations. This unit builds on and extends the range of key science concepts that you covered in Unit 1, including: properties, uses and production of some inorganic compounds; structures, reactions and properties of commercially important organic compounds; enthalpy changes; the cardiovascular system; ventilation and gas exchange in the lungs; urinary system structure and function; cell transport mechanisms; thermal physics; physical properties of materials; and fluids in motion.

Unit 6: Investigative Project

In this unit, you will carry out an investigative project that you have chosen in collaboration with your teacher.

Completing an investigative project is an excellent way for you to develop an understanding of the science-related workplace. The skills developed in this unit will be of considerable

benefit for progression to higher education in a variety of science and science-related courses and to employment in the science or applied science sector.

Unit 7-8: Optional units

In this unit you will be given the choice of what you wish to base your assignments on to tailor the course to your future aspirations. Units available include physiology, regulation & reproduction, biological molecules, diseases & infections, and genes & genetic engineering.

External assessment overview

External examinations will take place at the end of year 2 and will consist of two written papers and a written task.

Written papers
Unit 1: Principles and Applications of Science I; 2 hours with a total of 90 marks
The paper is split into three sections:
- Section A – Biology
- Section B – Chemistry
- Section C – Physics.

Unit 5: Principles and Applications of Science II; 2.5 hours with a total of 120 marks
The paper is split into three sections:
- Section A – Biology
- Section B – Chemistry
- Section C – Physics.

The papers will include a range of question types, including multiple choice, calculations, short answer and open response. These question types will assess discrete knowledge and understanding of the content in these units. It is possible to sit the assessments in January or June and one resit option is available to candidates for each exam.

Unit 3 assessment
This assessment involves carrying out a practical investigation and obtaining results. This must be completed in one session lasting one hour and 30 minutes, under supervised conditions.

The second part of the assessment involves results/observations obtained from the practical investigation set by the awarding body, completed in one sitting under supervised conditions. The assessment task will assess learners' ability to plan, record, process, analyse and evaluate scientific findings, using primary and secondary information/data.

Specific Entry Requirements:

5 GCSEs (Grades 9-4) including chemistry or combined science, English language and mathematics