Pearson BTEC Level 5 Higher National Diploma in Quantity Surveying

1. Construction Design Project

The success of any project relies on the development of a good design and the technical information to allow the project to be built. The aim of this unit is to help students to appreciate and be aware of the design process and the information required to communicate the design itself, specify and quantify materials, provide instructions for the assembly and erection, and facilitate precise costing and project management. Topics included in this unit are: project phases; construction drawing; detailing; Computer Aided Design (CAD); Building Information Modelling (BIM); schedules; specifications; bills of quantities; information collaboration. On successful completion of the unit, students will be able to analyse scenarios, make decisions and produce drawings and specifications to achieve appropriate, creative and innovative home design proposals

2. The Construction Environment

The construction industry is one of the major contributors to CO2 emissions. Also, the way that buildings are designed, constructed and maintained means they have an ongoing impact on the environment. Similarly, as a major employer, the industry has an ongoing impact on the working conditions of those in the sector and the way that people are educated, trained and supported through their careers. In this unit, students will explore the make-up and the impact of the construction industry on the environment and society. By exploring the roles and relationships of individuals and organisations in the construction sector, students will gain an overview of the organisational and the personal ways in which the sector works to continue to improve the built environment and limit its impact on the environment, while maintaining economic sustainability and growth.

3. Science & Materials

This unit aims to support students to make material choices to achieve the desired outcomes of a brief. This is approached from the perspective of materials being fit for purpose; as defined by testing standards and properties, but also by consideration of the environmental impact and sustainability. Awareness of health & safety is considered alongside the need to meet legislative requirements. The topics covered in this unit include: health and safety; storage and use of materials; handling and problems associated with misuse and unprotected use; environmental and sustainable

consideration in material choices; human comfort performance parameters. Material choice is developed through the understanding of testing procedures to establish conformity to standards and define performance properties. The performance of materials to satisfy regulations and provide appropriate comfort levels is addressed through design and calculations.

4. Measurement & Estimating

The overall aim of this unit is to give students an understanding of the quantity surveying techniques of measurement and the estimation of rates for the compilation of tender information. This is a vital activity in achieving a successful outcome for a contracting company in tendering and winning work. Topics included in this unit are: estimating techniques; standard methods of measurement; taking-off dimensions; preparation of bills of quantities; estimating data collection; the assembly of an estimate for a work package.

5. Law & Legal Framework in Quantity Surveying

The quantity surveyor must act in accordance with appropriate legislation for all stakeholders. This ensures that they take a fair, equal and consistent approach in their professional dealings with clients and main contractors. Throughout the course of a project, a quantity surveyor will be called on to undertake different types of work in support of the specific stage of the project and the overall project goals. This will range from contract preparation and tendering, to cost management and, in some cases, mediation of disputes. In this unit, students will become familiar with the key legal frameworks and processes that inform and govern the activities of quantity surveying.

6. Digital Applications for Construction Information

Achieving successful projects in the built environment requires a range of different types of information to describe the project, quantify the materials, provide clear instructions for assembly and erection, and allow for accurate costing and management. Throughout the process of design, construction and post-occupancy management, information is critical. Central to construction information is the production of construction drawings. Theseprovide the geometric definition of a project through the use of graphic conventions. Most other forms of construction information will rely, to a greater or lesser degree,on reference to construction drawings. Therefore, the production of accurate and clearly defined construction drawings is a critical part of the overall construction information package. Digital applications play a key role in the production of construction drawings. They

provide a way to manage drawing information and make changes with greater efficiency and can be shared readily through a variety of digital communication systems. In this unit students will develop the skills to needed produce accurate and consistent construction information using industry-standard software. On completion of the unit,students will be able to produce a construction information package. Successful achievement of the unit, may also lead to vendor certification.

7. Surveying, Measuring & Setting Out

In practice, surveying functions are divided between the 'Land Surveyor' to establish the positional reference and provide topographic data, and the 'Civil Engineer' to provide control of construction (setting out) and monitoring. Since there is dependence and commonality between them, this unit covers both contexts equally. In this unit, students will explore the techniques used to set up controls and conductinitial surveys, including communication of results and methods of setting out the built environment. Students will be able to identify and analyse the sources of error and mitigation techniques used in common aspects of surveying.

8. Quantity Surveying Practice

The quantity surveyor plays an important role in the design and construction team. They are involved initially in the client's feasibility studies when a project requires to be budgeted so that the client is aware of the cost of a project. A design is then produced, based on the feasibility study, and the quantity surveyor supports the tendering and procurement of a main contractor to undertake the work. This may be via the use of a bill of quantities (BoQ) produced by the quantity surveyor or through a specification for the project. The function of the quantity surveyor then moves on to the construction stage of a project. Here they are involved with the payments made to contractors from the client. This process is known as the valuation of the works and is undertaken on a regular time interval, or pre-determined stages of the project. The quantity surveyor will visit a site, measure the work produced to date and certify a payment for the client to make. Further functions of a quantity surveyor are to formulate the final costs for a client in the form of a final account. This may involve the resolution of any disputes and or claims made by the main contractor to a mutual agreement.

9. Group Project

While working in a team is an important skill in construction projects, collaboration

goes beyond just teamwork. The success of a project relies not only on the ability of each person in a team to do their work but also on each individual's awareness of how their work relates to the work of others, how to ensure that information is shared effectively and that roles and responsibilities are clear. Through this collaborative project-based unit, students will explore how to define roles in a collaborative team, recognising the skills (and 'skills gaps') of each member of the group. Together, students will work to develop a construction project based on their research and analysis, in response to the Pearson-set 'theme'. Content in this unit will typically include role identification and allocation, collaborative structures, human resources management, project management, procurement, tender documentation, information/data sharing, meetings, health and safety, project costing and Building Information Modelling (BIM).

10. Personal Professional Development

As a professional, learning is a continuous and lifelong process. In the construction industry there are constant changes in technology, materials, processes, legislation and practice. In order to stay up to date, it is necessary to recognise the potential of both structured, classroom-based learning and the learning gained through professional activities 'on the job'. This unit provides a framework in which students have the opportunity to reflect on and contextualise the learning they gain from working in the industry. In coordination with tutors and their employers, students will define the scope, duration and content of their expected work-based learning experience. Throughout the period of their work-based learning experience, students will be expected to record and reflect on their own learning.

11. Contract & Management

The successful management of a project relies on ensuring that work is undertaken in accordance with the terms of the contract that exists between client and contractor. In construction, a contract is the legally binding agreement between the client (who wants a project built) and the main contractor (who is responsible for constructing theproject). Time, quality and costs are covered by such contracts to ensure that a client receives a project that has been specified by their designer to a budget and at an agreed handover date for completion. The overall aim of this unit is to give students a working knowledge of contracts sothat they can manage a project team in accordance with the agreed terms and conditions of the contract. The principal person responsible for this is often the quantity surveyor and it is their responsibility to ensure compliance with the conditions of the contract. On successful completion of this unit, students will be able to run and administer a

project using the contract terms and conditions that have been agreed between a client and the main contractor. Students will also have the fundamental knowledge and skills to progress to a higher level of study.

12. Construction Technology for Complex Buildings Project

This unit focuses on the erection of buildings with complex requirements through the use of modern systems and methods of construction. Students will analyse the principles of buildability in terms of health and safety, efficiency, economy, sustainability and quality. The importance of developing a sustainable construction strategy is emphasised and students will explore the techniques and procedures involved in the safe and sustainable demolition of buildings. The importance of clear technical communication is also examined during and after the build process. This unit is designed to give students a thorough understanding of the technology involved in complex buildings. Students will discover how scientific solutions are applied to complex building projects through technology, the choice of materials, buildability and construction methods. Particular emphasis is placed on the consideration of sustainability and health and safety in the construction of complex structures.

13. Advanced Materials

The aim of this unit is to enable students to make decisions based on the application of knowledge and concepts related to advanced materials. As ever more innovative structural solutions are sought, so the need for greater understanding of material performance and behaviour is required. This encapsulates an understanding of the relationship between material microstructure, composition and mechanical properties in use, and also a knowledge of 'smart' materials that are at the heart of innovative material technology development.

14. Advanced Quantities for Complex Building Projects

This unit has been designed to enable students studying construction, civil engineering and building services engineering to apply, analyse and measure a range of components and elements found in large-scale buildings or structures, and to produce quantities within the function of a quantity surveyor. Topics included within this unit are: estimating techniques, standard methods of measurement, taking-off dimensions, preparation of bills of quantities, estimating data collection and the assembly of an estimate for a work package.

15. Value Engineering and Cost Control

A client's project needs to meet three essential outcomes. The first is value, the second time and the last quality. Value is the primary one that includes costs associated with the design, installation, operating and maintaining of the client's project. A client in today's economy expects a project to deliver 'value for money' against the functional use of the completed project. If alternatives can be explored that deliver the same outcomes for less expenditure, then substantial cost savings can be made. Value engineering, value planning and value analysis are all terms that are associated with such processes in ensuring that a client receives the best possible outcome for their project investment. Savings should not be seen as short-term goals but as longer term – over the life of a building from cradle to grave. This is termed 'lifecycle costing' and explores the costs associated with the whole life of a building. It may be prudent to spend more initially, to gain long-term savings over the life of a building. The quantity surveyor or cost consultant can, therefore, advise a client on initial expenditure and where their investment in the project gives the greatest engineered value in the long run. This is often the role of the professional quantity surveyor, engaged as the client's consultant. In this unit, students will explore the application of value engineering principles to scenarios or case studies in order to develop an understanding of how they are applied in a construction context. Students will also explore the various methods used to control costs. Through an understanding of cost control and value engineering, students will develop their knowledge and skills in order to manage and reconcile project costs.

16. Advanced Quantity Surveying Practice

The function of a quantity surveyor on a large project will take several forms. The professional quantity surveyor (PQS) will support the client in terms of the project's budget and obtaining tenders that are within this budget. Contract selection will be a function to enable legally binding agreements between the client and the main contractor. The PQS will advise a client as to which is the best contract to use for their project. The main contractor's quantity surveyor's function on a large project will be to assemble a quantity surveying team that can control the costs of the works in accordance with the tender sum submitted. They will also maximise the revenue potential against any variations, buying or construction processes to maximise the project's return. The quantity surveyor interacts with many different roles in project teams. They may work alongside the architect or designer, costing project elements and specifying, to arrive at a budget for the client. The main contractor's quantity surveyor interacts with the estimating and construction teams. They work to establish what the estimator has included in terms of prices from suppliers and subcontractors so that

orders can be placed in advance of the work commencing. Once the project has begun, they are involved in ensuring that the costs of the project are controlled to ensure they remain within the agreed contract sum. In this unit, students will expand their knowledge and understanding of quantity surveying practice, with the emphasis on more complex projects and contract requirements.