Pearson BTEC Level 5 HND in Construction and the Built Environment (Civil Engineering)

Individual Project

The aim of this unit is to support students in using and applying the knowledge and skills they have developed through other areas of their studies to complete and present an individual project. In addition, this unit will provide students with key study skills that will support them in further study.

Construction Technology

This unit will explain the terminology used in construction technology, describe the different techniques used to construct a range of substructures and superstructures, including their function, design selection criteria, identify the different types of civil engineering/infrastructure technology used in support of buildings, illustrate the supply and distribution of a range of building services and how they are accommodated within the building and understand and application of innovative approaches and technology in a real life.

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.

Construction Practice & Management

The unit compares and investigates small, medium and large construction companies within the market place and how construction processes, for development, have evolved.

Construction Information (Drawing, Detailing Specification)

Through this unit students will develop their awareness of different types of construction information and their uses in the process. Students will engage in the production, reading and editing of construction information, in order to understand how this information informs different stages of the process. Using industry standard tools and systems, students will consider the ways that information may be shared and, through this, the value of collaboration in the information process.

Mathematics for Construction

The aim of this unit is to use analytical and computational methods to solve construction related problems, investigate applications of statistical techniques to interpret, organize and present date by using appropriate computer software packages, illustrate the wide-ranging uses of calculus within difference construction disciplines by solving problems of differential and integral calculus, use mathematical methods to solve vector analysis, arithmetic progression and dimensional analysis examples and understand linear differential equation, Laplace, Fourier, Z-Transfer Functions and application of Eigenvalues and vectors.

Principles of Structural Design

Topics included in this unit are: methods and techniques used to determine bending moments and shear forces in simply supported steel and reinforced concrete beams; deflection in simply supported steel beams; and axial load carrying capacity of steel and reinforced concrete columns.

Tender & Procurement

The aim of this unit is to define what constitutes a tender and the information required for this process, explain the procedures and contractual arrangements for procurement (contract formation, breach of contract, torts and remedy), analyse the factors that affect the selection of construction procurement methods and documentation, calculate an estimate for a work (including time, cost, quality and associated matters) and financial appraisal on construction projects and related economics issues.

Group Project

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 & safety, project costing and Building Information Modelling.

Further Mathematics for Construction

The aim of this unit is to teach students to analyse and model civil engineering or building services engineering situations using mathematical techniques. Among the topics included in this unit are: number theory, complex numbers, matrix theory, linear equations, numerical integration, numerical differentiation, and graphical

representations of curves for estimation within an engineering context. Finally, students will expand their knowledge of calculus to discover how to model and solve problems using first and second order differential equations.

Geotechnics and Soil Mechanics

This unit explores the essential relationship between civil engineering and the Earth's crust, in the support of built structures and highways. The ability to understand, evaluate and develop solutions; related to soil and rock, is a key aspect of civil and structural engineering.

Advanced Structural Design

In managing the design and construction of modern structures, the civil or structural engineer must be able to carry out more complex calculations; dealing with dynamic conditions, while maintaining an awareness of the overall design intention.

Advanced Surveying & Measurement

This unit explores the techniques used to assess the accuracy of GPS co-ordinates, the creation and use of a control network, and it also explores transfer points and the use of software and technology

Alternative Methods of Construction

On successful completion of this unit students will have examined how the construction industry impacts on the environment; explored alternative construction methods which are fit for purpose; government policy implications and health & safety constraints associated with alternative construction methods; and designed a fit-for-purpose structure using an alternative construction method.

Hydraulic

The action, management and distribution of fluids, in relation to built structures, is critical. In civil engineering, it is necessary to ensure that we are able to manage the pressures that water may put on structures, either through its flow or the forces exerted and how to resist these. In building services, the balance between necessary pressures to ensure flow and distribution of fluids (through heating/cooling systems or domestic water supplies), and the sizing of pipes to support this flow, will determine efficiency and effectiveness of a system