UTC WARRINGTON

A SCIENCE & ENGINEERING ACADEMY & SIXTH FORM

# *Civil Engineering, BTEC Level 3 Diploma*

# What is Civil Engineering?

**Civil Engineering** is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment.

This can including works such as; roads, bridges, canals, dams, airports, sewerage systems, pipelines, and railways.

Civil engineering is traditionally broken into a number of sub-disciplines such as:

Construction Engineering

Structural Engineering

Surveying

Environmental Planning

Municipal Engineering

Material Engineering

It is the second-oldest engineering discipline after Military Engineering, and the term '*Civil*' is to defined and distinguish non-military engineering from military engineering

# Mr. James Miller BSc (Hons), MSc, PGCE

- Liverpool John Moores University: Construction Management/Structural Engineering BSc
- Liverpool John Moores University: Environmental Planning (Town Planning) MSc
- Worked in Melbourne Australia as a site Manager on Domestic Housing Projects
- Started working in the wider Victoria State area on Civil Engineering Projects
- Returned to England working as a Civil/Project Engineer
- Self employed as a Civil/Project Engineer
- PGCE at Chester University

# **The Course:** *Civil Engineering, BTEC Level 3 Diploma*

- The course has been designed to meet the needs of the Civil Engineering Industry. The Extended Diploma is a two-year, full-time course that meets entry requirements in its own right for learners who want to progress to higher education courses in construction areas before entering employment.

- It supports learners who want to progress directly to employment in roles in construction or a professional construction role and Higher Apprenticeships in the construction sector.

- Teaching will be 1080 guided learning hours and delivered through year 12 and 13

- A BTEC Level 3 Extended Diploma is Equivalent in size to three A Levels.

- 16 units of which 10 are mandatory and 3 are external.
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  Mandatory content (78%). External assessment (33%).

## What modules will the course include?

There will be **15** modules study to gain the qualification, these are:

| | |
|---|---|
| 1. Construction Principles | **120** Guided Learning Hours |
| 2. Construction Design | **120** Guided Learning Hours |
| 3. Tendering and Estimating | **120** Guided Learning Hours |
| 4. Construction Technology | **60** Guided Learning Hours |
| 5. Health and Safety in Construction | **60** Guided Learning Hours |
| 6. Site Engineering for Construction | **60** Guided Learning Hours |
| 7. Further Mathematics for Construction | **60** Guided Learning Hours |
| 8. Construction in Civil Engineering | **60** Guided Learning Hours |
| 9. Graphical Detailing in Construction | **60** Guided Learning Hours |
| 10. Building Regulations and Control in Construction | **60** Guided Learning Hours |
| 11. Work Experience in the Construction Sector | **60** Guided Learning Hours |
| 12. Projects in Construction | **60** Guided Learning Hours |
| 13. Building Information Modelling | **60** Guided Learning Hours |
| 14. Public Health Engineering | **60** Guided Learning Hours |
| 15. Specialist Civil Engineering Techniques | **60** Guided Learning Hours |

# Unit 1: Construction Principles

Level: 3

Unit type: External

Guided learning hours: 120


## Unit in brief

Learners demonstrate an understanding of the underlying principles used in the design, construction and refurbishments of buildings and infrastructure.

Start Date: September **2018** – Finish July **2019**

In this unit, you will develop the skills needed to solve a variety of practical construction problems by applying scientific knowledge and carrying out mathematical and statistical techniques.

You will learn about the science underpinning the manufacture, properties and degradation of construction materials.

You will apply mathematical principles and techniques to carry out calculations that determine how materials behave under the action of forces or loads when used as structural members, and draw conclusions regarding whether a material is fit for purpose.

# Unit 2: Construction Design


Level: **3**

Unit type: **External**

Guided learning hours: **120**

## Unit in brief

Learners will apply the principles and practice of design and construction for low- and medium-rise buildings and structures.

Start Date: September **2018** – Finish July **2019**

In this unit, you will learn the principles and practice involved in the design and construction of low- and medium-rise buildings and structures, and gain an understanding of how design is influenced by client requirements and external constraints.

You will consider the stages involved in the design and construction process and gain an understanding of the use of design techniques, including sketching and computer-aided design (CAD) to provide efficient methods of designing, constructing and maintaining structures over their life cycle.

# Unit 3: Tendering and Estimating

Level: 3

Unit type: External

Guided learning hours: 120

## Unit in brief

Learners carry out estimating procedures to produce an estimated project cost and then consider external factors and risk to develop a firm tender offer.

Start Date: September 2018 – Finish July 2019

Construction companies obtain work via the tendering and estimating process. An estimator uses the tender documents to arrive at an estimated cost of construction.

The estimator then works with commercial managers to consider the potential commercial risk and current workload, in order to arrive at a tender sum that is considered a correct and appropriate offer.

In this unit, you will learn how to consider a project scenario, together with relevant tender documentation, in order to produce a commercial risk assessment for use in a tender settlement meeting

# Unit 4: Construction Technology

Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners examine the underlying principles and construction methods used in the construction of new buildings and their associated external works.

Start Date: September 2018 – Finish Feb 2019

In this unit, you will examine various forms of low-rise construction and consider the most appropriate forms for differing site conditions and client requirements.

You will gain an understanding of the different types of foundation that could be used on a project and the factors that influence its selection.

You will investigate superstructure, external works design and construction, considering the most appropriate specifications and details for given scenarios.

# Unit 5: Health and Safety in Construction


Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners will carry out a safe system of work and investigate the significance of safety system reviews, understanding the responsibilities of employees and employers with regard to health and safety in construction operations.

Start Date: September 2018 – Finish Feb 2019

Health and safety in construction operations is essential so that workers can carry out practical activities in a safe environment that is free from hazards and risks.

Safety starts in the office, with planning safe systems of work, assessing the risks in construction operations and applying control measures to reduce the risks to an acceptable level.

Companies aspire to achieve the target of zero accidents in the workplace, promoting their reputation as safe constructors.

# Unit 11: Site Engineering for Construction

Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners undertake site engineering processes used to set out construction and built environment projects.

Start Date: September 2019 – Finish Feb 2020

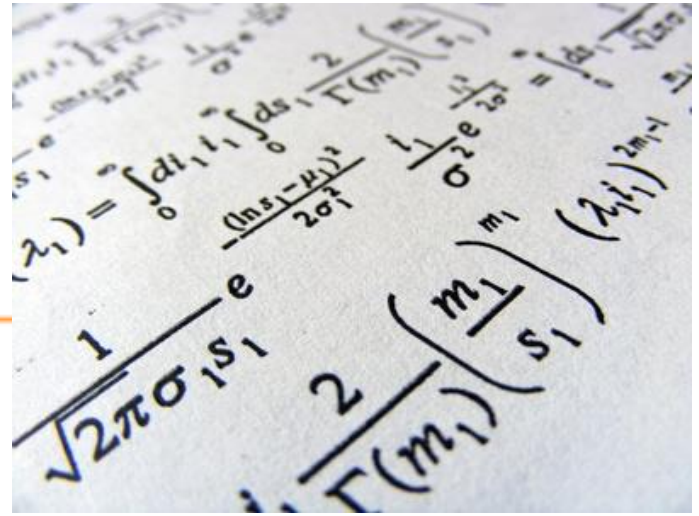
The skills required for setting out construction and civil engineering works involves a high degree of accuracy.

This is essential in meeting the tolerances of the elements that form the substructure and the superstructure so that the building, and its components, fit into position correctly.

For example, the specification for the installation of roads is often in terms of +/− 3 mm in level. Also, as a site engineer, you will need to be able to read dimensions from drawings provided by the designer and produce calculations to assist in setting out the work.

Building modern city landscapes requires the ability to control the verticality of multi-storey buildings to a high degree of accuracy from storey to storey

# Unit 15: Further Mathematics for Construction



Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners develop and use skills to apply rules of transposition of formulae, arithmetical methods, calculus and statistics to construction problems.

Start Date: Feb 2019 – Finish July 2019

In this unit, you will investigate relevant aspects of pure mathematics and explore how you can solve complex practical problems.

You will learn how to solve applied mathematical problems involving statistical data, structural properties for beams and columns, complex measurements, trigonometric identities, rates of change and decay, differentiation of maxima and minima, numerical integration, and complex areas or volumes by definite and indefinite integration.

# Unit 23: Construction in Civil Engineering

Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners develop designs for the substructures and superstructures in large-scale construction projects, for example roads, drainage and public facilities at railways, airports and harbours.

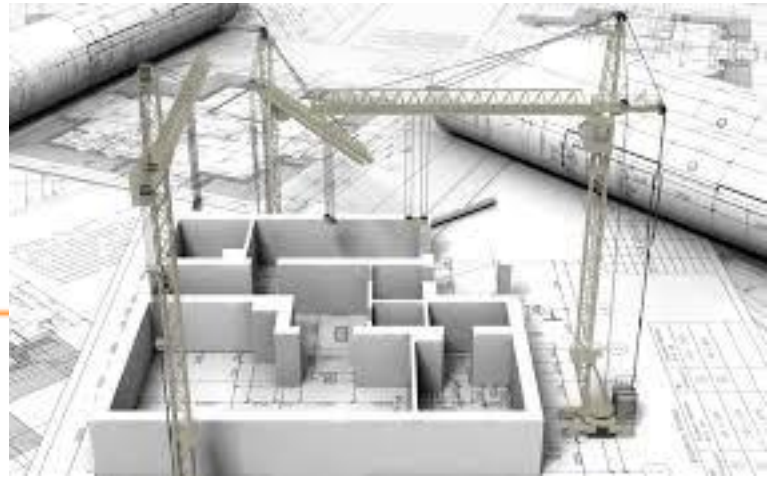
Start Date: Feb 2019 – Finish July 2019

In this unit, you will gain an understanding of the substructures and earthworks associated with civil engineering.

You will learn how water is contained and controlled, and how the excavation of earth forms cuttings, trenches and deep excavations.

The pouring of concrete and the formation of bridges, walls, foundations and other civil engineering structures is covered in terms of the plant and equipment used in construction.

# Unit 7: Graphical Detailing in Construction



Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners develop knowledge and apply skills to produce graphical information by manual and computer-aided design (CAD) methods.

Start Date: Feb 2020 – Finish July 2020

In this unit, you will develop an understanding of the range of media, equipment and techniques required to produce drawings manually and will learn about CAD techniques and requirements.

You will produce a number of drawings following British Standards using manual and CAD methods. This unit will help you develop the skills to produce freehand sketches.

# Unit 8: Building Regulations and Control in Construction

Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners interpret and apply the requirements of the building regulations to existing and new build schemes, including the application process and different methods of inspection and control.

Start Date: Feb 2020 – Finish July 2020

This unit will teach you how to apply for building regulations approval, which you will be able to use in professional practice in your future career.

To enable you to do this, you will learn about the different options available, the documents required and the process of making an application.

The unit is designed to be hands-on and practical and, on successful completion, you will have a good knowledge and understanding of the process.

# Unit 16: Work Experience in the Construction Sector


Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners explore the benefits of work experience, carrying out and reflecting on a period of work experience and planning for their personal and professional development.

Start Date: Sep 2019 – Finish Feb 2020

If you are thinking about a career in construction then you should carry out some work experience to make you aware of the kinds of tasks and activities you may be required to do.

It will help you reflect on and develop the attributes and skills required for work in the construction sector, and will also help to extend your knowledge and understanding of the roles and responsibilities of construction professionals.

# Unit 17: Projects in Construction

Level: 3

Unit type: Internal

Guided learning hours: 60

## Unit in brief

Learners explore a real-life construction project and consider the different aspects of the project, from design through to impact in use.

Start Date: Sep 2019 – Finish Feb 2020

In this unit, you will explore a real-life construction project. You will consider the categorisation of the project and the associated design considerations.

You will examine the methods and techniques of construction, and the materials used in the project, before developing an understanding of the potential economic and social impacts of the project.

You will consider the positive and negative impacts on the natural environment, locally and globally.