

# Higher Nationals

## Construction

### Example Assessment Briefs

For use with the Higher National Certificate and  
Higher National Diploma in Construction

First teaching from September 2018



**Higher National  
Certificate** Lvl 4

**Higher National  
Diploma** Lvl 5



**Pearson**  
**BTEC**

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# 1 Introduction

The Assessment Brief forms a critical part of the assessment process for students and teachers. The Brief should provide the student with a clear opportunity to achieve pass, merit or distinction through engaging in an assignment that will allow them to evidence their knowledge and skill through their achievement of learning. A well-structured assignment brief, that is contextualised by a vocational scenario, should provide the student with a modelled real-world situation that reflects the type of work that they may undertake in future employment.

Pearson Example Assessment Briefs (EABs) provide tutors with a reference point for the development of unique assignments, which are tailored to a specific location, employment context and the centre's approach to the subject. In addition, the EABs offer suggestions to encourage the development of collaborative and interpersonal skills, as well as developing cognitive skills and understanding of the professional behaviours associated with the relevant industry or sector. As with any assessment brief, the Pearson EABs are intended to provide a model of an assessment that is valid, sufficient, authentic, appropriate and relevant.

This booklet includes an EAB for every unit within the relevant Higher National qualification. Reviewing these will provide tutors with suggestions about the types of assignments that might be used for assessment, the structure and language of assignment briefs, and inspiration for how to develop new approaches.

## 1.1 Guidance only

EABs are for guidance and support only. They are **not** to be used directly for assessment.

These EABs are not developed with a context specific to a set of students or a location; both of which are critical to the development of good assessments. Centres **should** develop their own assignments, as they will be able to provide students with a relevant context and scenario.

EABs may be used as a starting point for the development of an assignment, however centres **must** modify and revise the Example Assessment Brief to provide students with a brief that is sufficiently localised, with a relevant vocational context/scenario, and a locally relevant set of assessment evidence requirements; in order that the assessment is rooted in the 'real world' of the students' experience.

All assignments must still be verified, in line with Pearson's requirements for internal verification of assignments and assessment results. For additional support and guidance please refer to our *Pearson BTEC Assignment Checking Service* on our website <http://qualifications.pearson.com>

## 2 Support materials

In addition to these EABs, Pearson have a range of additional support materials available. These are intended to provide you with further information to enhance your development of assignments and assessment practice.

### 2.1 Training Video – Assignment Writing and Assessment for RQF Pearson BTEC Higher Nationals

This training video explores:

- the principles and ethos of assessment in the new RQF Pearson BTEC Higher Nationals
- approaches to, and development of, assignment briefs mapped to learning outcomes and assessment
- documentation and requirements for assignments briefs
- the importance and process of internal verification.

We highly recommend tutors to watch the training video on the Pearson YouTube channel [here](#).

### 2.2 Training Video – Pearson-set Assignment for RQF Pearson BTEC Higher Nationals

This training video explores:

- the purpose of the Pearson-set assignment
- the timeline for release of themes and topics
- writing an assignment for the Pearson-set assignment
- integrating external links in learning, teaching and assessment
- related support materials.

We highly recommend tutors to watch the training video on the Pearson YouTube channel [here](#).

## 2.3 Support for Quality Assurance and Assessment of BTEC Higher Nationals

Pearson provide a range of information and guidance to support centres to deliver and manage quality in BTEC Higher Nationals.

Visiting our website, for Enhanced quality assurance, [here](#), provides information and guidance related to:

- Centre approval and re-approval
- Annual monitoring
- Planning units
- Learning strategies
- External links
- Assessment strategies
- Peer and self assessment
- Group work
- Time constrained assessment activities
- Quality assurance, including external examination, Annual Programme Monitoring Review (APMR) and the Annual Student Survey.

# 3 Example Assessment Briefs



## Unit 1: Individual Project (Pearson-set)

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>1 Individual Project (Pearson-set)</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Supply Chain Sustainability</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The submission is comprised of: <ul style="list-style-type: none"><li>• <b>Report</b> (2000-2500 words)</li><li>• <b>Presentation</b> (10-15 minutes)</li></ul>	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Formulate a project that will provide a solution to an identified problem	
<b>LO2</b> Manage a project within agreed timescales and specification; documenting the process throughout	
<b>LO3</b> Evaluate potential project management solutions	
<b>LO4</b> Produce a project report and deliver a presentation of the final project outcomes.	

## Assignment Brief and Guidance

You have recently gained employment, as an Assistant Project Manager, for a large general contracting firm. The firm specialises in community/ government projects. As part of the company's drive to provide better services to clients, they are seeking to improve the way that they are able to support greater sustainability in the projects that they undertake. While they have identified a range of different ways to address sustainability, they are of the opinion that they may achieve the greatest impact in **improving sustainability through the supply chain**.

You have been tasked with undertaking a project to review a recently completed community centre project (drawings and photos of the project are included here), and develop an alternative solution that will be enhanced through adjustments in the supply chain. In addition, you will be considering the overall project process and advising on project management solutions.

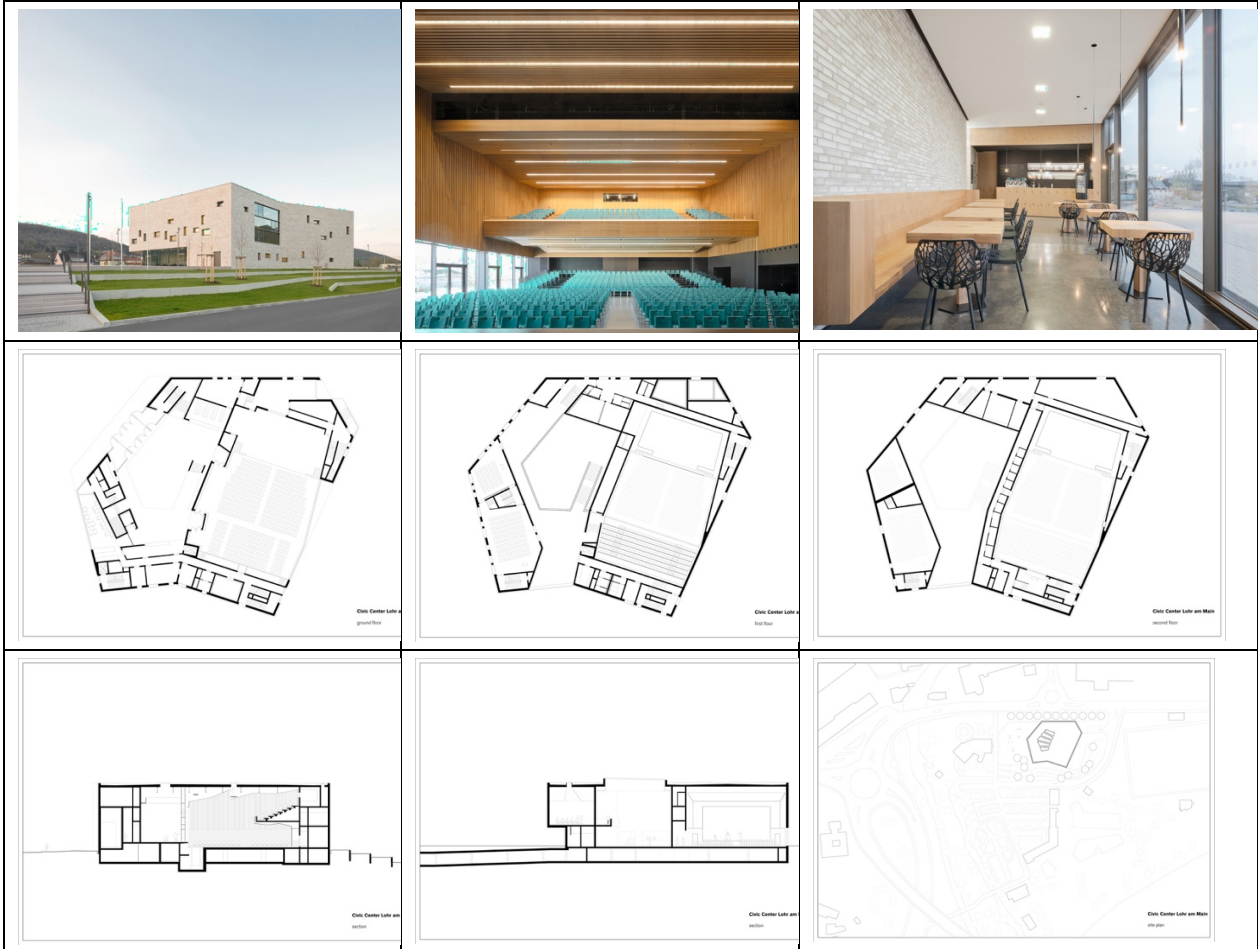
You are asked to prepare a report and a presentation.

Your **report** should:

- Clearly set out the set out the aims of your project, giving reasons for the project. You will identify the main components of your project and define these in a clear project specification. In addition, you will need to explain why the clear specification of the project is key to approaching a successful outcome.
- In reviewing the recently completed community centre project, and evaluating the materials used, you are asked to identify the potential resource, costs and timescale impact to changes in the supply chain. As changes to the supply chain may impact on the project process, you are asked to describe techniques for generating potential solutions to the overall project management. As you progress, you will maintain a project management plan and consider the time and resource tracking necessary.
- As part of project process, you asked to evaluate the relationships that may arise between project feasibility, planning on time and resources.
- Project management, and management of the supply chain, is critical to project success. You are asked to explore different project management strategies that may be suitable for your revised community centre proposal, and justify your selection of a preferred project management solution; comparing the outcomes that may result and their impact on resources, time and costs.
- As your report may be shared with clients, it is critical that appropriate forms of referencing and citation are used throughout.

In your presentation, to the company board of directors, you are asked to present your final project outcomes using industry standard software. As you are new to the company, the board will use your presentation as a staff development opportunity for you, so you asked to appraise your own performance in managing this project and make recommendations as to how you might improve for the future.

## Support Material



### Instructions and guidance to candidates

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Formulate a project that will provide a solution to an identified problem		<b>LO1 and LO2</b> <b>D1</b> Evaluate the relationship between project identification, feasibility and project planning, with consideration of the impact of project scope on time and resources
<b>P1</b> Select an appropriate construction-based project, giving reasons for your choice <b>P2</b> Identify the main components of a project specification	<b>M1</b> Explain why the project specification is of fundamental importance to a successful project outcome	
<b>LO2</b> Manage a project within agreed timescales and specification, documenting the process throughout		
<b>P3</b> Identify potential resources, costs and timescale <b>P4</b> Describe a range of appropriate techniques for generating realistic potential solutions	<b>M2</b> Prepare and update a project management plan, using standard systems of time and resource tracking	
<b>LO3</b> Evaluate potential project management solutions		<b>LO3 and LO4</b> <b>D2</b> Appraise your own performance in managing the project; draw conclusions and make recommendations that would further improve your performance in the future
<b>P5</b> Explore project management strategies to determine suitability for a given project <b>P6</b> Justify the selection of your preferred solution, making reference to your initial project specification	<b>M3</b> Compare the outcomes of your initial planned resources, timescales and costs against actual outcomes	
<b>LO4</b> Produce a project report and deliver a presentation of the final project outcomes		
<b>P7</b> Produce a written report identifying each stage of the project <b>P8</b> Utilise appropriate forms of referencing and citation in the preparation of a written report <b>P9</b> Prepare a presentation of your final project outcomes, utilising industry standard software	<b>M4</b> Present your final project outcomes and recommendations to a selected audience	

## Unit 2: Construction Technology

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>2 Construction Technology</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Technology Services</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The submission is comprised of the following: <ul style="list-style-type: none"><li>• <b>Written Design Report</b> (2000-2500 words)</li></ul>	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Discuss the terminology used in construction technology.	
<b>LO2</b> Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria.	
<b>LO3</b> Identify the different types of civil engineering/infrastructure technology used in support of buildings	
<b>LO4</b> Illustrate the supply and distribution of a range of building services and how they are accommodated within the building.	

## Assignment Brief and Guidance

You have recently gained employment with a contracting firm. The company provides a wide range of services for projects of all sizes. Lately, the firm has been seeing a slow-down in new contracts. To address this, the Board of Directors have decided to produce a report for sign-off by its management board, to help potential clients understand the nature of work that the company undertakes. The purpose of the report is to showcase a recent project that the company has undertaken. You have been asked to prepare this report. Based on a selected project, the report should cover the following areas:

- **Construction Terminology** – This will provide potential clients with key information about the terminology used in construction and construction technology and how functional characteristics, design selection criteria and sustainability have influenced the design of the building.
- **Superstructure & Substructure** – This section will assist clients in understanding the particulars of structural and civil engineering work, and should:
  - Discuss the role of pre-design studies and the design and functional characteristics of superstructures and substructures. In addition, you should analyse how site conditions impacted on the design of foundations and the ways in which the site for the project was remediated prior to the start of works on site by civil engineering works.
  - Explain the characteristics and criteria for primary and secondary elements of superstructures/substructures and detail how component parts of a superstructure or substructure work together to fulfil the required functions of the project.
  - Compare different types of structural frames that could have been used to carry the primary and secondary elements of the superstructure
  - Building Services – This section of the report will help the client understand the types of work included in building services contracts and should:
    - Describe the range of services required within the building and analyse how the supply and distribution of the primary services impacted on the overall design of the selected building.
    - Demonstrate how primary services may be facilitated by superstructure elements within the construction process.

The report should make use of any drawings, diagrams and data that may help to support your explanation of the various aspects. Any material that is taken from other sources, must be suitably cited and referenced.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>L01</b> Explain the terminology used in construction technology.</p>		
<p><b>P1</b> Describe the differences between residential, commercial and industrial buildings.</p> <p><b>P2</b> Explain how the functional characteristics and design selection criteria are informed by proposed building use.</p> <p><b>P3</b> Discuss the ways in which sustainability can be promoted in building projects.</p>	<p><b>M1</b> Apply the terminology used in construction technology to a given building construction project.</p>	
<p><b>L02</b> Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria.</p>		
<p><b>P4</b> Describe the pre-design studies carried out and types of information collected for a given construction site.</p> <p><b>P5</b> Explain the functional characteristics and design criteria for primary and secondary elements of a building substructure and superstructure.</p>	<p><b>M2</b> Analyse how site conditions impact on the design of foundations.</p> <p><b>M3</b> Illustrate how the component parts of an element allow it to fulfil its function.</p>	<p><b>L02 L03</b></p> <p><b>D2</b> Prepare a design report identifying superstructure, substructure and civil engineering structures necessary for a given building construction project.</p>
<p><b>L03</b> Identify the different types of civil engineering/infrastructure technology used in support of buildings</p>		
<p><b>P6</b> Describe techniques used for remediating the site prior to construction commencing</p> <p><b>P7</b> Describe the types of substructure works carried out by civil engineers</p>	<p><b>M4</b> Compare different types of structural frame used to carry the primary and secondary elements of the superstructure</p>	

Pass	Merit	Distinction
<p><b>LO4</b> Illustrate the supply and distribution of a range of building services and how they are accommodated within the building.</p>		<p><b>D3</b> Appraise how the distribution of the primary services impact on the overall design of the building</p>
<p><b>P8</b> Describe the supply arrangements for primary services</p> <p><b>P9</b> Explain the distribution arrangements for primary services</p>	<p><b>M5</b> Demonstrate the elements of the superstructure used to facilitate the primary services</p>	



## Unit 3: Science & Materials

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>3 Science &amp; Materials</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Sustainable Materials for Construction</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The submission comprises two related items: <ul style="list-style-type: none"><li>● <b>Presentation</b> (15 minutes)</li><li>● <b>Report</b> to accompany presentation (1000-1500 words)</li></ul>	

## Unit Learning Outcomes

**LO1** Review health and safety regulations and legislation associated with the storage, handling and use of materials on a construction site.

**LO2** Discuss the environmental and sustainability factors which can impact on and influence the material choices for a construction project.

**LO3** Justify material choice for a given building using performance properties, experimental data, sustainability and environmental consideration.

**LO4** Evaluate the performance of a given building in respect of its human comfort requirements.

## Assignment Brief and Guidance

You are employed by a large general contractor, as a Design Build Technician. The company has recently appointed a new Managing Director who has decided to shift the company's focus towards greater use of sustainable practices. To achieve this, the Managing Director has asked a number of staff to prepare presentations on how to improve sustainability within the construction process. You have been asked to prepare a presentation on 'Improving Sustainability through Material Selection.'

The Managing Director suggests that your **presentation** covers:

- an overview of health and safety regulations related to the handling of materials on site; considering the use of risk assessments to address hazards and explaining how regulations and legislation apply to specific site activities and planning for safe handling of materials.
- using an example, explain the process of material environmental profiling and life cycle assessment. This should consider the benefits of product declaration and environmental certification.
- using a selected project, develop and present a waste management plan that explores the relevant waste materials and their disposal.
- using data from experiments and performance properties and product data, justify a material selection for a chosen building element; discussing the properties in relation to regulatory requirements. This should include consideration of the effects of structural loading of materials and compare their behaviour.
- With regard to human comfort, evaluate the performance of selected materials; use calculations to show the performance of materials for human comfort.
- Illustrate how the environmental rating of a building can be improved through the use of sustainable materials, evaluating the use of passive and active strategies to minimise resource usage.

In order that those attending the presentation, can further consider the points raised, you are asked to prepare a related **Report**. This is not intended to be the same as the presentation, but will provide additional research, data, calculations and explanation of the issues raised in the report.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Review health and safety regulations and legislation associated with the storage, handling and use of materials on a construction site.</p>		
<p><b>P1</b> Explain how regulations impact on the use, storage and handling of a selection of vocationally typical construction materials.</p>	<p><b>M1</b> Assess how risk assessments can be used to address significant hazards posed by selected materials or activities.</p>	
<p><b>LO2</b> Discuss the environmental and sustainability factors which impact on and influence the material choices for a construction project.</p>		<p><b>D1</b> Explain how multiple regulations and legislation would apply to a given site activity, highlighting how to plan and manage for safe handling and use.</p> <p><b>LO2 LO3</b></p> <p><b>D2</b> Illustrate how the use of sustainable practices and considerations for material choice can improve the environmental rating of the completed building.</p>
<p><b>P2</b> Explain material environmental profiling and life cycle assessment. Use a relevant material to exemplify your explanation.</p> <p><b>P3</b> Discuss the benefits of product declaration and environmental certification.</p>	<p><b>M2</b> Produce a waste management plan for a given project, taking into account a typical range of relevant waste materials.</p>	
<p><b>LO3</b> Justify material choice for a given building using performance properties, experimental data, sustainability and environmental consideration</p>		
<p><b>P4</b> Present the results of relevant testing procedures to identify performance characteristics of selected construction materials.</p> <p><b>P5</b> Discuss the results in terms of the material properties and regulatory requirements, highlighting any unexpected results and why these may occur.</p> <p><b>P6</b> Select construction materials for a given building based upon their performance properties in use.</p>	<p><b>M3</b> Assess the effects of loading structural materials and compare the behaviours and performance of materials which could be used for the same function.</p>	

Pass	Merit	Distinction
<p><b>LO4</b> Evaluate the performance of a given building in respect of its human comfort requirements.</p>		
<p><b>P7</b> Present a material selection strategy with regard to human comfort requirements.</p> <p><b>P8</b> Using the selection strategy specify material choices for a selected area.</p>	<p><b>M4</b> Perform calculations which relate to a selected area (lux levels, u-values, acoustic and ventilation).</p>	

## Unit 4: Construction Practice & Management

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>4 Construction Practice &amp; Management</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Companies and the Tender Process</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The submission is a <b>Report</b> (1500-2000 words)	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Describe the construction industry with reference to company structures and other activities	
<b>LO2</b> Explain different types of construction companies in the market and their relationships within the tendering process	
<b>LO3</b> Discuss the key stages in a construction project, and how Building Information Modelling informs the different stages	
<b>LO4</b> Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of health & safety.	

## Assignment Brief and Guidance

You have been working for a small family-owned construction firm. Much of the work of this firm has been in private residential work, but under new management there is a desire to begin to undertake larger scale non-domestic work. In order for this change to be managed effectively, the company will need to change its structure. The management team recognises that such changes will have an impact on many aspects of the company, and the processes they use.

The management team has asked you to prepare a report to assist them in considering the changes that may be needed and the relationships that will need to be formed, if they are to succeed in transforming the business.

It is suggested that your report consider:

- **The Construction industry**, with a focus on how the industry has developed and the forms of professionalism within the sector. Further, consideration and demonstration of the links that exist between different parts of a construction organisation. This will lead to an analysis of how the industry had developed; based on company structures, employees and types of work; including an identification of various forms of work that contractors tender. Based on this, you should critically evaluate how construction firms have developed a relation between their structure and the company ethos.
- **Construction Companies** – by identifying different types of company in the construction sector you will be able to explain the relationship between different types or organisation and analyse these relationships through contracts and tendering. Further, a comparison of the factors that influence contract relationships will allow you to show how this effects those involved in tendering for projects.
- **Project Stages** – with the firm moving to more complex projects, there is a need to have examples that identify the processes and sequences using in modern construction and how this relates to sustainability. This will also allow you to explain the contract planning techniques used for different scales of project. BIM is becoming a critical feature in larger projects, so you are asked to identify how BIM will impact on operations and company organisation, as well as; more broadly, analyse how BIM has impacted on the development of innovation in design and contracts for different types of project. Combined, these factors will allow you provide a detailed analysis of how the industry has evolved innovative approaches to construction and contracts.
- **Collaboration** – the firm recognises that larger projects will require a greater level of collaboration, so you are asked to explain how this has driven health & safety to become an integrated aspect of the construction process and describe the legislation that benchmarks health and safety in the sector and demonstrate how the industry has benefitted from this legislation. Further, you should consider the relationship between collaboration and health and safety by discussing the role that collaboration and communication play in promoting safe working practices. Finally, evaluating the impact of health & safety legislation will allow you to explain how this has, through different drivers, created advantages and challenges for the industry.

**Instructions and guidance to candidates**

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Describe the construction industry with reference to company structures and other activities		<b>D1</b> Critically evaluate how construction companies have developed their structure and business ethos
<b>P1</b> Explain how the construction industry has developed and encompassed professionalism within its structures	<b>M1</b> Analyse how the construction industry has developed overall in terms of company structures, it's employees and contracted work	
<b>P2</b> Demonstrate the scope and linkage between all parties within a construction organisation	<b>P3</b> Identify the type of contractual work tendered by contractors	
<b>LO2</b> Explain different types of construction companies within the market and their relationships within the tendering process		<b>D2</b> Compare the factors that influence contract relationships between different organisations involved in tendering.
<b>P4</b> Identify the different types of construction companies in the market	<b>M2</b> Analyse the relationships between construction companies through contracts and tendering	
<b>P5</b> Explain the relationship between different construction organisations		
<b>LO3</b> Discuss the key stages in a construction project, and how Building Information Modelling informs the different stages		<b>D3</b> Provide a detailed analysis of how the construction industry has evolved in terms of innovative construction methods and contracts
<b>P6</b> Identify, with examples, modern construction processes and sequences used within today's industry, highlighting the way they respond to sustainability needs	<b>M3</b> Analyse how construction has developed in terms of innovation, designs, and within contracts for micro and macro projects, and the interrelationship with BIM	
<b>P7</b> Explain contract planning techniques used within micro and macro projects		
<b>P8</b> Identify where BIM impacts upon operations and construction companies		



Pass	Merit	Distinction
<p><b>LO4</b> Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of Health &amp; Safety</p>		<p><b>D4</b> Evaluate the impact of Health &amp; Safety legislation, how it has evolved the drivers for it, and its advantages or weaknesses within construction</p>
<p><b>P9</b> Explain how Health &amp; Safety has now become an integrated part of the construction process</p> <p><b>P10</b> Describe the government legislation which has benchmarked Health &amp; Safety within construction</p> <p><b>P11</b> Discuss the role of collaboration and communication in ensuring safe working practices</p>	<p><b>M4</b> Demonstrate how the construction industry has benefited through changes in Health &amp; Safety legislation</p>	

## Unit 5: Legal & Statutory Responsibilities in Construction

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>5 Legal &amp; Statutory Responsibilities in Construction</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Contracts &amp; Law in Construction</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
An audio-visual <b>Presentation</b> (20-minutes, with a further 5-minutes for Q&A), with print-out of slides for the audience. A <b>Research File</b> , providing the supporting material to back up your presentation.	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Examine the process used to obtain planning permission for the construction and alteration of buildings	
<b>LO2</b> Discuss the processes and regulations used to control design and to ensure safe buildings	
<b>LO3</b> Assess the laws used to ensure that construction sites operate safely and consider adjoining land-users	
<b>LO4</b> Assess how the law of contract and land law are used to sell and lease land and buildings.	

## Assignment Brief and Guidance

You have recently been employed as an Assistant Project Manager for a contractor. The company has a long track record in the construction of commercial and residential projects for developer clients. A new Managing Director has been appointed and has a strategy to move the company into development. This will mean that the company will be involved in the process of procuring property, developing projects, construction and then sale of the finished asset.

You have been asked to undertake research and deliver a presentation on the statutory and legal processes involved in construction and development, in order to support other parts of the company to understand some of the responsibilities that will become a part of the project process. The Managing Director asks that your presentation cover the following areas:

- **Planning** – In this area, there is a need to explain the legislation and related agencies that are involved in the planning process. This should also explain how planning decisions are made; including the overall process, appeals and monitoring. Based on this, you will be able to analyse the role of planning and planning agencies in the development of land and buildings.
- **Building Regulations** – With regard to building regulations/building control, explain the legislation, agencies and process of obtaining building regulation approval, appeals and monitoring of the process; with particular emphasis on the legislation related residential and commercial buildings. In addition, you should evaluate the impact of planning and building regulations on the development of land and buildings.
- **Safety & Liability** – Discuss how the law of trespass and nuisance relate to construction; as well as how the laws associated with liability (both occupier and various) apply in construction. Using an example project of your choice, you should design and present a detailed plan for how the company might manage the legal impacts of a large urban project.
- **Contracts, Sales & Lease** – As the company plans to move into development, which will involve the sale or lease of land/buildings, you should include an analysis of how land law has evolved and the role of contract law in terms of the purchase and sale of property. In addition, the team will need to understand how landlord and tenant law is used in the management of property. All of these legal matters need to be evaluated in relation to the control and disposal of property, this can be further assessed by using an example of a large-scale urban project.

Your **presentation** should be no more than 20-minutes and allow for 5-minutes of questions & answers to follow. You should provide your audience with a printout of slides, that they can use to take notes and review following the presentation.

To support the presentation and allow the managing director to understand the issues in greater depth, you are asked to compile a **research file** that includes the data, references and your notes used in compiling the material included in the presentation. To facilitate ease of reading, the research file should follow the same structure as the presentation. Please ensure that all references use a suitable form of citation, so that it is clear where the source material derives.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Examine the process used to obtain planning permission for the construction and alteration of buildings		<b>D1</b> Evaluate the impact of planning systems and building regulations agencies in managing the development of land and buildings.
<b>P1</b> Explain the key legislation and agencies in the planning process. <b>P2</b> Explain how planning decisions are made and processes available to appeal and monitor them.	<b>M1</b> Analyse the role of planning systems and agencies in managing the development of land and buildings.	
<b>LO2</b> Discuss the processes and regulations used to control design and to ensure safe buildings		
<b>P3</b> Explain the key legislation and agencies in the building control process. <b>P4</b> Discuss how building decisions are determined and the processes available to appeal and monitor them.	<b>M2</b> Analyse the application of building regulations in low and medium rise residential and commercial buildings.	
<b>LO3</b> Assess the laws used to ensure that construction sites operate safely and consider adjoining land-users.		<b>D2</b> Design a detailed plan for a contractor to reduce the legal impacts of a large urban construction project. Present a strategy to address the legal and statutory issues associated with the sale of a large urban construction site.
<b>P5</b> Explain how the law of trespass and nuisance relate to the construction industry. <b>P6</b> Discuss how the laws of occupiers' liability and vicarious liability apply to the construction industry.	<b>M3</b> Produce a plan for a contractor to manage the legal impacts of a large urban construction project.	
<b>LO4</b> Assess how the law of contract and land law are used to sell and lease land and buildings.		<b>D3</b> Evaluate the impact of land law and property law in the development and disposal of a large urban construction project.
<b>P7</b> Explain how land law has evolved to shape modern land ownership and the role of contract law in buying and selling property. <b>P8</b> Discuss how landlord and tenant law is used to manage property.	<b>M4</b> Analyse how the application of land law and landlord and tenant law control the disposal and use of property.	

## Unit 6: Construction Information (Drawing, Detailing, Specification)

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>6 Construction Information (Drawing, Detailing, Specification)</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• Construction Information Glossary (1500 words)</li> <li>• Construction Information Package</li> <li>• Construction Information Review</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Evaluate different types of construction information in the context of diverse project types</p> <p><b>LO2</b> Develop construction drawings, details, schedules and specifications in support of a given construction project</p> <p><b>LO3</b> Interpret different types of construction information in order to explain a construction project</p> <p><b>LO4</b> Assess ways in which construction professionals collaborate in the production of construction information.</p>	

## Assignment Brief and Guidance

You have been employed, as an architectural technician, by a local contracting firm that specialises in residential projects. The company has, in the past, relied on the design and construction drawings produced by architects or supplied by the client. Recognising that the company has, over the years, developed a very strong sense of good residential design and construction knowledge, they have decided to begin offering design and information production services for their clients. This will, they feel, allow them to diversify the services they offer

In order to support their development of this part of the business, they have asked you to prepare a number of 'exemplar' documents that can be used to help different teams in the company to understand how construction information is developed and used. You have been asked to prepare:

- A **Construction Information Glossary** that will explain the features and user of construction information for different project types, describing them and giving examples of their use. By comparing related types of information, you will highlight the suitability of these for different types or scale of projects. Your definitions, in the glossary, should include an assessment of the different participants involved in production of different types of information, and the relationships between the different types of information and how they are used together. Within the glossary you should include definitions of CAD and BIM; comparing the ways in which they are used in collaborative development of construction information. The Glossary should be no more than 1500 words in length.
- A **Construction Information Package** that will include general arrangement drawings, selected details and door/window schedules. In addition, this will include an outline bill of quantities, and a schedule of works.
- In the **Construction Information Review** you will use a set of construction information provided to you to relate drawings to the specification and evaluate the drawings and details, to identify clashes within the information. Further, you will use this review to critique the information and identify errors and discrepancies across the various elements. Within the review, you will propose corrections to drawings and specifications; using industry-standard notation/mark-up.

### Instructions and guidance to candidates

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Evaluate different types of construction information in the context of diverse project types		<b>D1</b> Justify the use of specific types of construction information in support of a given project
<b>P1</b> Explain the use of construction information in the context of a project	<b>M1</b> Compare different types of construction information to identify their suitability in specific contexts	
<b>P2</b> Describe the different types of construction information and their uses		
<b>LO2</b> Develop construction drawings, details, schedules and specifications in support of a given construction project		
<b>P3</b> Develop a set of general arrangement drawings, selected details and door/window schedules	<b>M2</b> Compose a schedule of works	
<b>P4</b> Produce an outline bill of quantities		
<b>LO3</b> Interpret different types of construction information in order to explain a construction project		
<b>P5</b> Relate a set of construction drawings to a specification	<b>M3</b> Critique a body of construction information, identifying errors and discrepancies	
<b>P6</b> Evaluate construction drawings and details to identify 'clashes'		<b>D2</b> Propose corrections to construction drawings and specifications using industry standard forms of notation
<b>LO4</b> Assess ways in which construction professionals collaborate in the production of construction information.		
<b>P7</b> Assess the types of information produced by different participants in a construction project	<b>M4</b> Compare the roles of CAD and BIM in the collaborative production of construction information	
<b>P8</b> Examine the relationship between different bodies of information and how they work in conjunction		



## Unit 7: Surveying, Measuring & Setting-out

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>7 Surveying, Measuring &amp; Setting-out</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
	<ul style="list-style-type: none"><li>• Survey Data &amp; Report (1000-1500 words)</li><li>• Presentation (15-minutes)</li></ul>
<b>Unit Learning Outcomes</b>	
	<p><b>L01</b> Undertake a survey to establish a station network for horizontal and vertical control</p> <p><b>L02</b> Explain the process of undertaking a topographic survey</p> <p><b>L03</b> Apply industry standard techniques in the production, transferring and staking out of co-ordinates of multiple construction elements</p> <p><b>L04</b> Prepare a report on the causes of errors and techniques to improve accuracy, including the use of digital data.</p>

## Assignment Brief and Guidance

You are employed by a local surveying company and have been approached by a national property development company for a full topographic survey of a local plot of land. The topographic **survey** is required for the initial and detailed design process.

Part of the requirement is to set a control network of stations that can be used for future surveys and to aid in the setting out once construction commences. The client requires the network to be robust with a minimum of five stations. Your survey data will also need to include your calculation of corrected coordinates and heights of the stations, and calculations comparing the accuracy of the closed traverse survey.

Using your data from the survey, the client has requested that you transfer the project information to the total station, and complete the setting out; using both free-station and total station with both horizontal and vertical control. To confirm accuracy, you will need to analyse the tie distances and total station, as well as other means.

Following your survey and establishment of a control network, you are asked to prepare a **report** for the client. This will describe the different types of control networks, including both local and national stations. This will also evaluate the cause of errors in surveying, setting-out and data transfer.

In a **presentation**, to the client, you are asked to explain the overall process of conducting a survey, and describe (with examples) the common coding system and data exchange processes involved in surveying and setting out. By reviewing the content of your topographic survey, you will discuss your analysis of its suitability to support the design. Finally, you are asked to analyse and assess the accuracy of the topographic survey and the techniques used in setting-out.

## Instructions and guidance to candidates

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Undertake a survey to establish a station network for horizontal and vertical control.		<b>D1</b> Assess the accuracy of a network in the production of a topographic survey.
<p><b>P1</b> Describe the types of control networks that are available for surveying, including examples of local and national stations.</p> <p><b>P2</b> Carry out a closed traverse survey of a network, including at least five stations.</p> <p><b>P3</b> Calculate corrected co-ordinates and heights for the stations and explain the stages used.</p>	<p><b>M1</b> Calculate and compare the accuracy achieved in a closed traverse survey.</p>	
<b>L02</b> Explain the process of undertaking a topographic survey.		
<p><b>P4</b> Explain the process of conducting a topographic survey for a given plot of land, including initial control.</p> <p><b>P5</b> Describe, with examples, common coding systems and data exchange processes, including communicating final outcomes.</p>	<p><b>M2</b> Review the content of a topographic survey, including analysis of its suitability to assist the design team in completing the design.</p>	
<b>L03</b> Apply industry standard techniques in the production, transferring and staking out of co-ordinates of multiple construction elements		<b>D2</b> Analyse both the accuracy achieved and the techniques used during the practical exercise
<p><b>P6</b> Extract and transfer the required data from a given project to a total station in order to allow Setting-out to commence</p> <p><b>P7</b> Complete a full Setting-out operation on a given project by utilising a total station free station programme, including both horizontal and vertical control</p>	<p><b>M3</b> Analyse the accuracy achieved from a Setting-out operation from tie distances recorded, total station stored data and another means</p>	

Pass	Merit	Distinction
<b>LO4</b> Prepare a report on the causes of errors and techniques to improve accuracy, including the use of digital data		<b>D3</b> Analyse the techniques used to improve accuracy, including the implication of Setting-out errors and the application of industry standard technology/software
<b>P8</b> Prepare a report on the common causes of errors in both Setting-out and surveying  <b>P9</b> Compare the accuracy of Setting-out data to national standards	<b>M4</b> Evaluate the causes of errors in surveying, Setting-out and data transfer	

## Unit 8: Mathematics for Construction

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### Example Assessment Brief

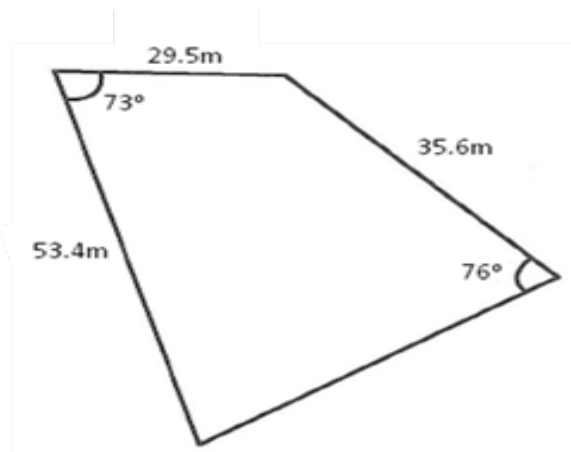
Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>8 Mathematics for Construction</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Final Examination</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The assignment is a series of time constrained, open book, examinations. You are required to submit both your calculations (working-out) as well as the answer. You should clearly identify the question number associated with the relevant calculation; to allow the assessor to review your work.	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Use analytical and computational methods to solve construction related problems <b>LO2</b> Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages <b>LO3</b> Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus. <b>LO4</b> Use mathematical methods to solve vector analysis, arithmetic progression and dimensional analysis examples.	

## Assignment Brief and Guidance

### Examination 1

**You are required to evaluate the construction problems below and justify, where applicable, the techniques adopted to solve such problems.**

- 1A.** You have surveyed one of the buildings sites which your company is to develop. It is in the form of a quadrilateral as shown in the figure below. You are asked to determine:
- the length of the perimeter of the site.
  - the total area of the site to be developed.



- 1B.** A simply supported beam of S355 strength steel is required to support a load ( $W$ ) of 333 kN. The span of the beam ( $L$ ) is 5.5 m. You are asked to:
- Calculate the deflection of the beam in (mm). The deflection formula can be expressed by:

$$\delta = \frac{5 W L^3}{384 E I}$$

where:

$$E = 210,000 \text{ N/mm}^2$$

$$I = 11,700 \text{ cm}^4$$

- 1C.** Solve the following simultaneous equations:

$$2x + y = 5$$

and

$$x^2 - y^2 = 3$$

**1D.** A formula for the velocity ( $v$ ) of waves in shallow water is:

$$v^2 = 0.55L \tanh\left(\frac{6.3d}{L}\right)$$

Where:

$d$  is the depth

$L$  is the wavelength

- i. If  $d=9.0$  and  $L=92$ , calculate the value of  $v$ .

**1E.** The mass, in grams, of a ball bearing varies directly with the cube of the radius, measured in millimetres. A ball bearing of radius 4 mm has a mass of 115.2g. Calculate the following:

- i. A ball bearing has a radius of 6 mm. What is its mass?  
ii. A ball bearing has a mass of 48.6g. What is its radius?

**1F.** Undertake the following:

- i. Evaluate the following matrices:

$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} + \begin{pmatrix} 1 & 1 \\ -1 & -2 \end{pmatrix}$$

$$3 \begin{pmatrix} 1 & 2 \\ -1 & 0 \end{pmatrix}$$

$$\begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix} * \begin{bmatrix} -2 & 0 \\ 5 & -6 \end{bmatrix}$$

- ii. Transpose the matrix:

$A$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$$

- iii. Find the inverse of the matrix:

$$\begin{bmatrix} 5 & 2 \\ 1 & 5 \end{bmatrix}$$

**1G.** Concrete strength is usually related to its strength at 28 days based on the load that a standard cube of concrete can sustain when tested in compression in a compression testing rig. The data below contains the results for a series of 40 concrete strength tests undertaken on a construction project currently being developed by your company.

Data	
Cube No.	$f_c$ (N/mm <sup>2</sup> )
1	36.64
2	40.96
3	27.42
4	24.12
5	41.44
6	34.94
7	25.32
8	41.14
9	37.36
10	31.64
11	41.42
12	37.53
13	23.34
14	36.43
15	31.81
16	33.65
17	33.88
18	38.19
19	24.79
20	24.81

Data	
Cube No.	$f_c$ (N/mm <sup>2</sup> )
21	23.47
22	34.29
23	32.09
24	24.89
25	25.67
26	33.78
27	38.61
28	37.23
29	31.31
30	26.39
31	24.39
32	42.99
33	32.69
34	38.16
35	36.49
36	42.87
37	41.54
38	28.61
39	37.37
40	30.22

You are required to *summarise* this data and *calculate* the following:

- i. the mean strength
- ii. the median strength
- iii. the standard deviation for the results
- iv. the percentage of blocks which fall between +/- one standard deviation
- v. estimate the probability that the strength of a given concrete cube will exceed 37 N/mm<sup>2</sup>
- vi. apply binomial distribution methods to determine the probability of testing a cube which will exceed 37 N/mm<sup>2</sup> within the next 5 tests



**1H.** You have been asked to interpret data from a hypothesis test. A test was conducted for two proportions to evaluate if they are the same. Within the laboratory, an R&D project was developed to assess a newly designed concrete in two batches, sample A and sample B. A batch from sample A evaluated that 51 designs from a sample of 190 models was successful. However, a batch from sample B determined 323 simulated models succeeded in a sample of 601.

The null hypothesis ( $H_0$ ) for the test is that the proportions are the same, and the alternate hypothesis ( $H_1$ ), is that the proportions are not the same.

Use a 5% alpha (confidence) level to determine if the two batches are comparable? Illustrate all steps of your method before assessing if the data is comparable, in terms of accepting or rejecting the 'null hypothesis'.

## Examination 2

You are required to analyse differential calculus techniques.

**2A.** Differentiate the following:

i.  $5x^4$

ii.  $e^{\sin 2x}$

iii.  $\ln \cos(3x)$

iv.  $(3x^2 - 2x + 7)^2$

**2B.** Integrate the following definite and indefinite integrals:

i.  $\int (3x^2 + 2x + 5) dx$

ii.  $\int (2 - 7x)^5 dx$

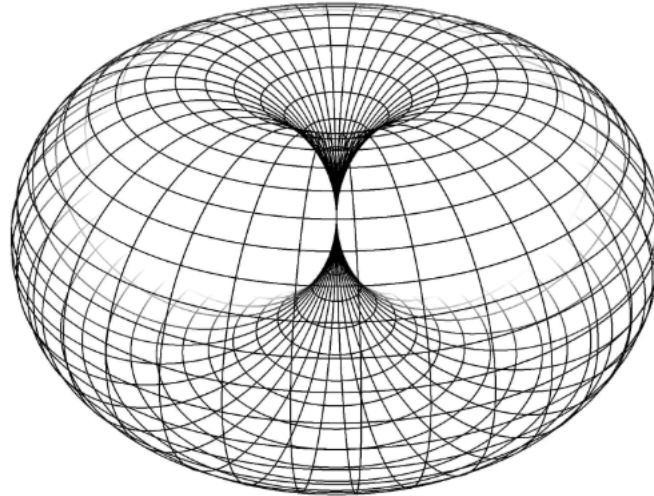
iii.  $\int \frac{\sec^2 x}{\tan x} dx$

iv.  $\int x^2 e^{3x} dx$

v.  $\int \sqrt{\frac{(x-1)}{(x+1)}} dx$

**2C.** Undertake the following:

- i. Sketch the functions  $y = x^2$  and  $y = 8 - x^2$  on an x-y system of axes and using integral calculus determine the area enclosed by them.
- ii. The area from part A is rotated  $360^\circ$  about the x-axis. Using integral calculus determine the volume produced



**2D.** A continuous steel beam in a framed structure is to be checked. The bending moment  $M$  due to external forces acting on the beam is given by the equation below, where  $L$  is the horizontal distance along the beam's span.



$$M = 2L \left( \frac{1.8L^2 - 60}{2} \right) + 1.5L$$

Using differential calculus, determine the following:

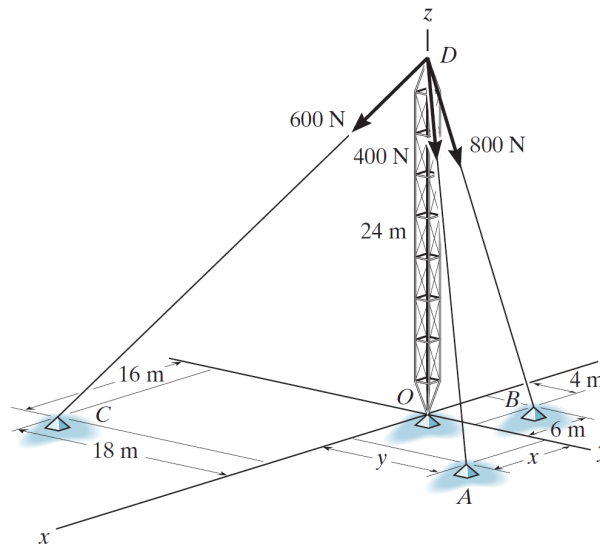
- i. the distance at which the beam experiences its maximum and minimum bending stress
- ii. the value of  $L$  when the bending stress is zero.
- iii. What are the steps in the method for finding the maximum or minimum value of the function?
- iv. Explain why there might be one point which is a zero of the derivative but not a local maxima or minima. Give examples and support your answer using sketches or diagrams.

### Examination 3

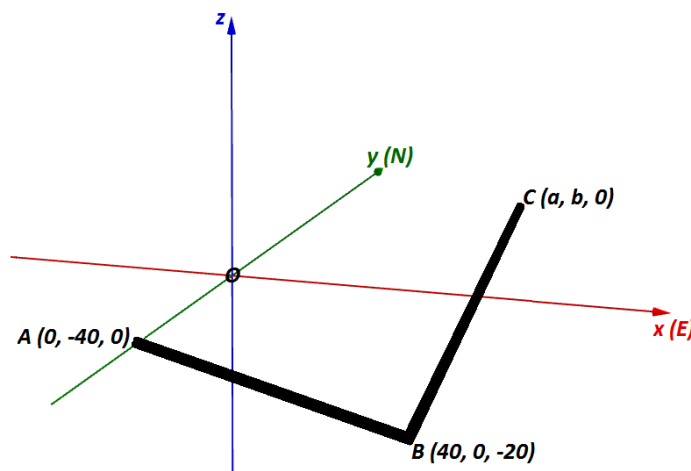
3. You are required to evaluate the effectiveness and relevance, to the solving of construction problems, of the mathematical techniques of vector analysis, arithmetic progression and dimensional analysis

3A. A steel frame tower is held in place by three cables. If the force of each cable  $F_{DA}$ ,  $F_{DB}$  and  $F_{DC}$  acting on the tower is shown, determine the magnitude and coordinate direction angles of the resultant force  $F_R$ .

i. Use a cartesian vector notation  $(i, j, k)$ . Take  $x = 20$  m,  $y = 15$  m.



3B. A pipeline is to be fitted under a road and can be represented on 3D Cartesian axes as below, with the  $x$ -axis pointing East, the  $y$ -axis North, and the  $z$ -axis vertical. The pipeline is to consist of a straight section  $AB$  directly under the road, and another straight section  $BC$  connected to the first. All lengths are in metres.



- Calculate the distance  $AB$ .
- The section  $BC$  is to be drilled in the direction of the vector  $3i + 4j + k$ .
- Find the angle between the sections  $AB$  and  $BC$ .

**3C.** The company needs to bore a hole 120m deep.



- i. **Estimate using arithmetic progression the cost of boring, if the cost is £70 for drilling the first metre with an increase in cost of £3 per metre for each succeeding metre.**

**3D.** A brick supplier produced product charges by the following method.

Quantity Price:

1 pallet of 500 bricks £300

2nd pallet of 500 bricks £295

3rd pallet of 500 bricks £290 and so on with a maximum order of 5000 bricks.

- i. **Using arithmetic progression determine how much an order of 5000 bricks would cost.**

**3E.** The energy head loss  $K$  in a flow system is to be determined using the Bernoulli's equation shown below:

$$\frac{p}{\rho g} + \frac{v^2}{2g} + h = K$$

Where:

$$v = 3.1 \text{ m/s}$$

$$p = 200 \text{ KN/m}^2$$

$$\rho = 1000 \text{ Kg/m}^3$$

$$g = 9.81 \text{ m/s}^2$$

$$h = 6 \text{ m}$$

- i. **Determine the total head loss.**
- ii. **Using dimensional analysis, establish the SI unit for the final value.**

### Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Use analytical and computational methods to solve construction related problems		<b>D1</b> Evaluate analytical and statistical findings from construction problems completed and justify the techniques adopted to solve such problems.
<b>P1</b> Solve construction problems using trigonometry techniques <b>P2</b> Solve construction problems using algebraic techniques	<b>M1</b> Apply the use of matrices to solve problems	
<b>LO2</b> Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages		
<b>P3</b> Apply statistical methods, including the calculation of the mean and standard deviation, to produce accurate and appropriate solutions to construction engineering problems <b>P4</b> Calculate probabilities within both binomially distributed and normally distributed random variables	<b>M2</b> Interpret the results of a statistical hypothesis test conducted from a given scenario	
<b>LO3</b> Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus		<b>D2</b> Analyse differential calculus techniques in the determination of maxima and minima in construction industry-related problem.
<b>P5</b> Use differential calculus techniques to solve functions which incorporate: $ax^n$ , sine $ax$ , cosine $ax$ , $\log_e x$ , $e^{ax}$ and methods including function of a function. <b>P6</b> Use integral calculus techniques to determine indefinite and definite integrals of functions involving $ax^n$ , sine $ax$ , cosine $ax$ , $1/x$ , and $e^{ax}$ .	<b>M3</b> Apply the rules of integral calculus to determine solutions for complex construction related problems	

Pass	Merit	Distinction
<b>LO4</b> Use mathematical methods to solve vector analysis, arithmetic progression and dimensional analysis examples		
<p><b>P7</b> Apply dimensional analysis to solve problems</p> <p><b>P8</b> Generalise answers from a contextualised arithmetic progression problems</p>	<b>M4</b> Solve construction problems using vector analysis	<b>D3</b> Evaluate the effectiveness and relevance, to the solving of complex construction problems, of the mathematical technique of vector analysis.

## Unit 9: Principles of Heating Services Design & Installation

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>9 Principles of Heating Services Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• <b>Client Report</b> (1000-1500 words)</li> <li>• <b>Heating System Specification</b> (1000-1500 words), including calculations, drawings, diagrams, product data, etc.</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Identify pre-design information required for a non-domestic heating system</p> <p><b>LO2</b> Analyse heating loads for non-domestic buildings</p> <p><b>LO3</b> Design a non-domestic heating system for a given building type</p> <p><b>LO4</b> Justify the selection of non-domestic heating system components and installation strategy.</p>	

## Assignment Brief and Guidance

You have recently gained employment as an assistant building services design engineer for a local building services company. The company is involved in the specification, design and installation of heating systems; primarily for non-domestic buildings.

The company is working with a new client. The client is a small developer, moving into non-residential projects for the first time. They are developing a number of medium sized industrial units, as part of a larger industrial park development. Your company has been appointed to design and specify the heating systems for these industrial units. The head Design Engineer has tasked you with producing a report (to assist the client in understanding the process of building services design and installation) and developing the specification for the heating system. The Report and the Specification will need to relate to each other.

The **Client Report** needs to explain the design process for heating systems in non-domestic buildings, and discuss the types of information that will be produced. This should also evaluate the health & safety legislation that will be constraints upon the design and analyse how to meet human comfort requirements. Analysis of the proposed system should consider how it meets the requirements for health & safety and other relevant legislation. As you develop a design for the heating system, you will also need to discuss alternative strategies and justify the selection of the system that is being proposed; analysing the criteria that support the selection. You will also need to analyse the sustainability of the alternatives and the selected system. Based on the

To support the **Specification**, you will produce design data and the design information for the system. This will include the calculation of U-values for the project, heat loss and total heating load. In relation to these calculations, you will compare them to the minimum requirements for the given building type; including air infiltration requirements.

The Specification will also need to show calculation of pipe sizes and pipework resistance in the index circuit. These will link to the selection and justification of heating system components; including the criteria for heat emitters and heat source. Given the range of components specified, you will need to discuss how this impacts on an installation strategy.

Your Report and Specification should include drawings, diagrammes, manufacturer's information, and supporting calculations.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)



## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Identify pre-design information required for a non-domestic heating system		
<p><b>P1</b> Explain the design process stages and tasks that must be considered for the design of a non-domestic heating system</p> <p><b>P2</b> Discuss the information that should be included in a design brief for a non-domestic heating system design</p> <p><b>P3</b> Produce design data for a heating</p>	<p><b>P1</b> Explain the design process stages and tasks that must be considered for the design of a non-domestic heating system</p> <p><b>P2</b> Discuss the information that should be included in a design brief for a non-domestic heating system design</p>	
<b>LO2</b> Analyse heating loads for non-domestic buildings		
<p><b>P4</b> Calculate U-values for a given structure</p> <p><b>P5</b> Calculate heat loss for spaces within a given building</p> <p><b>P6</b> Calculate the total heating load for a given building</p>	<p><b>M3</b> Analyse the current requirements for minimum U-values in domestic and non-domestic buildings, including infiltration rates</p>	
<b>LO3</b> Design a non-domestic heating system for a given building type		
<p><b>P7</b> Discuss suitable alternative heating strategies for a given building</p> <p><b>P8</b> Explore the design criteria for the selection of heat emitters and heat source, and the criteria for their selection</p> <p><b>P9</b> Produce a design proposal for a non-domestic heating system</p>	<p><b>M4</b> Select a suitable heating strategy for a given building and analyse the reasons behind their selection</p> <p><b>M5</b> Justify the selection of suitable heat emitters and heat source for a given building a</p>	

Pass	Merit	Distinction
<p><b>LO4</b> Justify the selection of non-domestic heating system components and installation strategy.</p>		
<p><b>P10</b> Calculate sizes of pipework for a given building</p> <p><b>P11</b> Identify the index circuit and calculate the pipework resistance</p> <p><b>P12</b> Justify the selection of a range of non-domestic heating system components</p>	<p><b>M6</b> Discuss how the selection of different components impacts on an installation strategy</p>	

## Unit 10: Principles of Ventilation & Air Conditioning Design & Installation

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>9 Principles of Ventilation &amp; Air Conditioning Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>WeAreOffice</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<p><b>Presentation</b> (15minutes) of an air conditioning design and installation strategy; supported by an accompanying <b>Report</b> (2000-2500 words) and data. This will include:</p> <ul style="list-style-type: none"> <li>• Drawings, diagrams</li> <li>• Specifications</li> <li>• Calculations</li> <li>• Product/manufacturers' data</li> <li>• Etc.</li> </ul>	

## Unit Learning Outcomes

**LO1** Identify pre-design information required for a non-domestic ventilation and air conditioning system

**LO2** Analyse cooling load for non-domestic buildings

**LO3** Present a design for a non-domestic ventilation and air conditioning system for a given building type

**LO4** Justify the selection of non-domestic ventilation and air conditioning components and an installation strategy.

## Assignment Brief and Guidance

You have recently gained employment, as an assistant building services designer, with a local building services contractor. The company is engaged in both the design and installation of building services systems for small/medium-sized commercial and industrial buildings.

The company has been contracted, by a local developer (WeAreOffice), to design and install an air conditioning system in an existing industrial building that is to be converted into a series of office spaces. Your role will be to develop the **design and installation strategy** for the project; under the supervision of the lead system designer. You are asked to produce the material that will be required for the design and installation teams to develop their detailed plans for the system and its installation. To this end you are asked to produce the following, in support of the design and installation strategy:

- Pre-design information; explaining the design process (stages and tasks) and discussing the information required in a brief for a non-domestic air conditioning system. This will include the production of design data for the given building and evaluating the design constraints.
- To support the above, you will need to calculate heat gains for one of the office units within the proposed project, as well as the total cooling load for the building and the peak summertime temperature for different rooms. Based on these calculations you will analyse strategies to reduce the total cooling load and make recommendations based on analysis of the peak summertime conditions. In addition, you will need to analyse health & safety as well as environmental legislation that will impact on the design of an air conditioning system.
- Using your pre-design information, you will design a non-domestic air conditioning and ventilation system; discussing the different strategies and specifying the components necessary (including ductwork sizing) and justify the selection of components. As part of this you will discuss the impact of different duct sizing on the performance of the system.
- Through evaluation of your proposed design, you should consider how sustainable options can be included within the proposal.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Identify pre-design information required for a non-domestic ventilation and air conditioning system		<b>LO1 and LO2</b> <b>D1</b> Analyse Health & Safety and environmental legislation relevant to the design, installation and operation of a non-domestic ventilation and air conditioning system
<b>P1</b> Explain the design process stages and tasks for the design of a non-domestic ventilation and air conditioning system <b>P2</b> Discuss the information included in a design brief for a non-domestic ventilation and air conditioning system design <b>P3</b> Produce design data for a ventilation and air conditioning system in a given building	<b>M1</b> Evaluate the design considerations and constraints for the design of a non-domestic ventilation and air conditioning system for a given building	
<b>LO2</b> Analyse cooling load for non-domestic buildings		
<b>P4</b> Calculate the heat gains for a room within a given building <b>P5</b> Calculate the total cooling load for a given building <b>P6</b> Calculate the peak summertime temperature for rooms in a given building	<b>M2</b> Analyse strategies that could be used to reduce the total cooling load calculated for the given building <b>M3</b> Analyse the peak summertime temperatures calculated, making suitable recommendations	

Pass	Merit	Distinction
<b>LO3</b> Present a design for a non-domestic ventilation and air conditioning system for a given building type		<b>LO3 and LO4</b> <b>D2</b> Evaluate sustainable options for inclusion in a ventilation and air conditioning strategy for a given building type
<b>P7</b> Discuss ventilation strategies for a given building  <b>P8</b> Present a ventilation and air conditioning design proposal for a given building type	<b>M3</b> Compare different ventilation strategies to determine best practice	
<b>LO4</b> Justify the selection of non-domestic ventilation and air conditioning components and an installation strategy.		
<b>P9</b> Specify ventilation and air conditioning components, including ductwork sizing for a given building  <b>P10</b> Justify the selection of components for a non-domestic ventilation and air conditioning system	<b>M5</b> Discuss the effect of different duct sizing on the performance of a ventilation and air conditioning installation	

## Unit 11: Measurement & Estimating

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>11 Measurement &amp; Estimating</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Business Incubator</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<p><b>Presentation</b> (approx. 15-minutes) with 5-minutes of question &amp; answer. An <b>Estimation File</b> which will include your research, calculations, measurements, take-offs. This is to provide background information for your audience to review after the presentation.</p>	



## Unit Learning Outcomes

**LO1** Define standard measurement techniques used for taking-off quantities for estimating purposes

**LO2** Perform taking-off techniques in the production of a range of quantities for a structure

**LO3** Interpret the principles and techniques of estimating in compiling a final price

**LO4** Prepare an estimate for a work activity.

## Assignment Brief and Guidance

You are working for a local quantity surveying firm, that specialises in commercial and industrial projects. The firm has been appointed by a new client, who are moving from construction into project development, as well. They have recently acquired an existing small industrial building that they plan to convert into a *small business incubator*; which will include a range of different sized units for new businesses/start-ups.

The Senior Estimator has asked you to take on the responsibility for developing information to assist the client in understanding the processes of measurement and estimating and the preparation of an estimate for a work activity related to the project. These will be presented to the client, to provide them with a clear understanding of how you will be undertaking the necessary work for estimating the project costs.

Your presentation will:

- Explain the techniques for producing accurate quantities and how a rule of measurement supports this. Comparing different techniques for producing quantities will allow you to critically evaluate an estimating technique and its accuracy.
- Using dimension paper, show the taking-off of quantities for a range of construction activities and abstract these. To produce an accurate bill of quantities for a work section, from the design drawings, you will need to apply a standard method of measurement.
- To illustrate the way in which labour informs estimates, you will calculate labour unit rates and all-in rates for a range of construction activities and analyse the factors that have an effect on the compilation of unit rates.
- Finally, you will present your estimate for a work activity by producing a comprehensive estimate and explain the level of variation in estimates. Comparing the techniques used will allow you to evaluate estimating techniques for the different stages of a project lifecycle.

In addition to the above, within your presentation, you are asked to provide an **Estimation File**. This will include your research, measurements, take-offs and calculations that support the estimate that you have presented. This file should follow the same structure as your presentation, to allow the audience to understand the relationship between material in the file and what you have presented. This is to be compiled and made available within an A4 formatted PDF file.

### **Instructions and guidance to candidates**

Your presentation will be approximately 15 minutes. You should provide hard-copy of any additional information that your audience may need, for reference, as an A4 booklet.

There will be approximately 5 minutes of question & answer time, following your presentation.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Define standard measurement techniques used for taking-off quantities for estimating purposes		<b>D1</b> Critically evaluate an estimating technique to its accuracy in the production of quantities
<b>P1</b> Explain the techniques used in the production of accurate quantities <b>P2</b> Explain how a rule of measurement supports accurate quantities	<b>M1</b> Compare techniques used for production of quantities against the lifecycle of a project	
<b>LO2</b> Define standard measurement techniques used for taking-off quantities for estimating purposes		<b>D2</b> Produce an accurate bill of quantities work section from final design drawings
<b>P3</b> Take-off quantities using dimension paper for a range of construction activities <b>P4</b> Abstract a range of quantities for construction activities	<b>M2</b> Accurately apply a standard method of measurement to the production of quantities	
<b>LO3</b> Interpret the principles and techniques of estimating in compiling a final price		<b>LO3 and LO4</b> <b>D3</b> Evaluate estimating techniques used for the different stages of a project's lifecycle
<b>P5</b> Calculate labour unit rates for an estimate by compiling and processing rate build-up data <b>P6</b> Calculate all in rates for a range of construction activities	<b>M3</b> Analyse the factors that have an effect upon the compilation of unit rates for an estimate	
<b>LO4</b> Prepare an estimate for a work activity		
<b>P7</b> Produce a comprehensive estimate for a work section or activity <b>P8</b> Explain the reasons for the level of variation in estimates received by stakeholders	<b>M4</b> Compare the techniques used for the formulation of budgets with estimating final design costs	

## Unit 12: Financial Management & Business Practices in Construction

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>12 Financial Management &amp; Business Practices in Construction</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>"Follow the Money"</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Presentation</b> (approx. 15-20 minutes) <b>Resource Management Report</b> (1000-1500 words)	

## Unit Learning Outcomes

**LO1** Explain the legal status of different types of building companies

**LO2** Explore different sources of finance available to a construction company and strategies used to manage finance

**LO3** Evaluate forms of company organisation within the contemporary construction industry

**LO4** Illustrate the different strategies used by a construction company to manage resources.

## Assignment Brief and Guidance

You are employed as an Assistant Project Manager for a well-established contracting firm that specialises in commercial projects. Your company is expanding through the acquisition of a small development firm. Some of the staff, in both companies, are unclear as to how this proposed acquisition will impact the overall company. Therefore, you have been asked to prepare a short presentation that will inform staff about the different aspects of this merger.

The Managing Director has suggested that your presentation:

- Explains the legal requirements for different types of companies and differentiate between company types, comparing them in relation to their context. This should assess the ways in which companies are wound-up and dissolved.
- Explore the different sources of capital available to construction companies and the ways in which borrowing is used; including the cost of borrowing. This should be illustrated, using an example project, to analyse borrowing requirements and the balance sheet for the company.
- By discussing the strategic policies that a construction company may adopt, you will differentiate between strategic and operational management. This will enable an evaluation of different organisational structures that the merged company may adopt, and assess how these may enable collaborative practices and appraise the management and leadership that will support the company. To ensure that the company is prepared for the future, you should discuss the education and training needs that will be required.

Given that the merged company will have a new set of needs and opportunities, you are asked to provide a **Resource Management Report** that will illustrate the strategies may be used by the company to manage their resources. In this report, you are asked to describe the labour management strategies that may be adopted, and how this will affect different aspects of the process; including the management of physical resources and materials on site. In addition, you should discuss the factors that may determine decisions around the purchase or hire of plant and equipment. Finally, you will evaluate strategies to incentivise labour productivity on site.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Explain the legal status of different types of building companies		<b>D1</b> Assess the different strategies available for winding-up or dissolution of a construction company
<p><b>P1</b> Differentiate between the different statuses of construction companies</p> <p><b>P2</b> Explain the legal requirements relating to different companies in relation to their status</p>	<p><b>M1</b> Compare different company types and advise on a suitable type for a given context</p>	
<b>LO2</b> Explore different sources of finance available to a construction company and strategies used to manage finance		<b>D2</b> Analyse the balance sheet of a typical construction company
<p><b>P3</b> Explore the different sources of capital, available for borrowing, by the construction company</p> <p><b>P4</b> Discuss a range of techniques for assessing the cost of borrowing</p>	<p><b>M2</b> Analyse the borrowing requirements for a given project</p>	
<b>LO3</b> Evaluate forms of company organisation within the contemporary construction industry		<b>D3</b> Appraise a range of different management leadership styles for suitability for construction management
<p><b>P5</b> Discuss the strategic policies of a construction company</p> <p><b>P6</b> Evaluate the different organisation structures of a range of different sizes of construction company</p> <p><b>P7</b> Discuss the education and training needs of a range of different construction personnel</p>	<p><b>M3</b> Differentiate between strategic and operational management strategies</p> <p><b>M4</b> Assess company organisational structures in relation to collaborative working practices</p>	

Pass	Merit	Distinction
<b>LO4</b> Illustrate the different strategies used by a construction company to manage resources		
<b>P8</b> Describe the labour management strategies used by the construction company  <b>P9</b> Describe the management strategies for dealing with materials on-site	<b>M5</b> Discuss the factors to be considered when comparing the purchase or hire of plant and equipment	



## Unit 13: Tender & Procurement

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>13 Tender &amp; Procurement</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Apprenticeship Support: Presentation &amp; Estimate</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Presentation</b> (approx. 15 minutes)</li><li>• Example <b>Estimate for a Work Activity</b></li></ul>	

## Unit Learning Outcomes

- LO1** Define what constitutes a tender and the information required for this process
- LO2** Explain the procedures and contractual arrangements for tendering
- LO3** Analyse the factors that affect the selection of construction procurement methods
- LO4** Calculate an estimate for a work activity.

## Assignment Brief and Guidance

You have been appointed as an Assistant Project Manager for a local developer. The company has recently taken on a number of apprentices. As part of the training for the apprentices, you have been asked to give a presentation and prepare an example **estimate** for a work activity.

Your **presentation** needs to:

- Explain the information required for a tender, and the documentation required for a major project and discuss the potential of Building Information Modelling to support the tender process.
- Through comparing the use of specifications and bills of quantities, in a privately funded project, you will critically evaluate their use in developing a competitive tender.
- To illustrate process, you will present the results of a taking-off process in producing a bill of quantities, and describe the relationship between the type of tender and different taking-off techniques.
- Given the companies' emphasis on design-build, you will compare the type of tendering that may support this form of procurement. Along with this, you should evaluate the relationship between taking-off technique and contractual arrangements for a given project.
- To help the apprentices understand procurement, you should explore and explain the factors that will affect private and public procurement routes and the selection of an estimating technique. Further, analysis of a procurement process for public stakeholder will allow apprentices to understand how this differs from the private. Assessing the effect of a given estimating technique on the selection of a procurement method, for a major project, will provide an illustration of the key elements of procurement.

Your example **estimate for a work activity** will describe the common methods for estimating individual work activities, with examples. Based on this you will show the process of producing and estimate for given work activity in a major project. In addition, you should compare the results of different estimating techniques on the cost for the work activity.

You should provide copies of the estimate of a work activity, to the apprentices when you give your presentation and use this to illustrate and explain aspects of the process in your presentation.

**Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Define what constitutes a tender and the information required for this process		<b>D1</b> Critically evaluate the use of specifications or bills of quantities in terms of providing a competitive tender
<p><b>P1</b> Explain the information required to be produced prior to tendering</p> <p><b>P2</b> Explain the documentation required to formulate a tender for a major project</p> <p><b>P3</b> Discuss the potential benefits of Building Information Modelling in the tender and procurement process</p>	<p><b>M1</b> Compare the use of specifications and bills of quantities as tendering methods used for a privately funded project</p>	
<b>L02</b> Explain the procedures and contractual arrangements for tendering.		<b>D2</b> Evaluate the relationship between taking-off techniques and the type of contractual arrangements for a project
<p><b>P4</b> Present the results of a taking-off procedure in producing a bill of quantities</p> <p><b>P5</b> Describe the relationship between the type of tender and different taking-off techniques for a procurement strategy</p>	<p><b>M2</b> Compare the types of tendering available for a design and build project</p>	

Pass	Merit	Distinction
<b>L03</b> Analyse the factors that affect the selection of construction procurement methods		<b>L03 L04</b> <b>D3</b> Assess the effect of a given estimating technique on the selection of a procurement method for a major project
<b>P6</b> Explore the factors that affect private and public procurement routes for a client  <b>P7</b> Explain the factors that determine the selection of an estimating technique	<b>M3</b> Analyse the procurement processes for a public stakeholder	
<b>L04</b> Calculate an estimate for a work activity		
<b>P8</b> Describe the common methods of estimating for individual work activities  <b>P9</b> Produce an estimate for a given work activity in relation to a major project	<b>M4</b> Compare the results of different estimation techniques on the cost for a given work activity in a major project	

## Unit 14: Building Information Modelling

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>14 Building Information Modelling</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Presentation</b> (20-minutes), with 5 minutes for Q&A. <b>Case Study</b> (1000-1500 words)	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Discuss the term Building Information Modelling in the context of local, national and global developments in the construction industry <b>LO2</b> Describe the basic concepts surrounding Building Information Modelling <b>LO3</b> Discuss the differences in purpose between Building Information Modelling and its associated outcomes, and traditional forms of construction information <b>LO4</b> Assess ways in which the design and construction process of an asset influences the way that asset is managed and maintained.	

## Assignment Brief and Guidance

You are employed by a mid-sized construction company, as an Assistant Architectural Technologist. You are responsible for developing and managing construction information for projects in the company. As the company is beginning to take on larger projects there is an increasing demand from clients and consultants for your company to work with and provide Building Information Modelling (BIM) data and support.

BIM is a new concept for many of the people in the company, including the management team. You are asked to prepare a **presentation** that will:

- explain the term Building Information Modelling and its role in the industry, and analyse the importance of BIM in the construction industry.
- Discuss the key terms and definitions related to BIM, and analyse the way these terms inform members of a project team.
- Based on the above, provide a critical analysis of the impact of BIM on the construction industry and how it effects the capital and operational phases of a facility.
- Discuss the key themes in BIM and explain the terms that support BIM Dimensions. Analysing the ways that BIM can be implemented in a project will allow you to create and critically evaluate a BIM Execution Plan and how BIM Dimensions influence different aspects of a project.

In support of your presentation, you are asked to develop a **case study**; based on a project of your choice. As the company is familiar with traditional forms of construction information, your **case study** should help differentiate BIM from the traditional forms. This may include:

- An exploration of the differences between traditional and BIM-related processes; discussing how collaborative work is supported by BIM.
- Analysing how BIM informs project outcomes for the design team, will help the company to assess how BIM enabled process can result in better outcomes for the owner; in ways that exceed that of traditional methods.
- An explanation of how information is generated and managed, using BIM, through project stages and analyse the way information is shared and managed.
- In addition, you should explain the roles that are required within a team to support a BIM-enabled project and evaluate these roles in delivering a successful project.

## Instructions and guidance to candidates

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Discuss the term Building Information Modelling in the context of local, national and global developments in the construction industry		<b>D1</b> Critically analyse the impact of Building Information Modelling on the construction industry and how it can positively affect both the capital and operational phase of a facility
<p><b>P1</b> Explain the term Building Information Modelling and how it relates to the construction industry</p> <p><b>P2</b> Discuss the key terms and definitions in regard to Building Information Modelling</p>	<p><b>M1</b> Analyse the importance of Building Information Modelling in the construction industry</p> <p><b>M2</b> Analyse the way that key terms and consistency of these terms should inform all members of a project team</p>	
<b>LO2</b> Describe the basic concepts surrounding Building Information Modelling		<b>D2</b> Critically evaluate and create a BIM Execution Plan and understand how BIM Dimensions can influence various elements of a building project
<p><b>P3</b> Discuss the key themes surrounding BIM</p> <p><b>P4</b> Explain the terms that support BIM Dimensions on a project</p>	<b>M3</b> Analyse ways in which BIM can be utilised on a building project	



Pass	Merit	Distinction
<p><b>LO3</b> Discuss the differences in purpose between Building Information Modelling and its associated outcomes, and traditional forms of construction information</p>		
<p><b>P5</b> Explore the key differences between traditional and Building Information Management (BIM) related processes in relation to construction</p> <p><b>P6</b> Discuss how collaborative working can aid and support a BIM process</p>	<p><b>M3</b> Analyse how BIM can inform a project outcome for the design team over and above traditional methods</p>	<p><b>LO3 LO4</b></p> <p><b>D3</b> Assess how a BIM-enabled process can result in positive outcomes for an asset owner, over and above traditional methods</p>
<p><b>LO4</b> Assess ways in which the design and construction process of an asset influences the way that asset is managed and maintained</p>		
<p><b>P7</b> Explain how information is created, managed and used through various stages of a project</p> <p><b>P8</b> Explain the roles that are required as part of a BIM-enabled project and how they aid in the development of the project at all stages</p>	<p><b>M5</b> Analyse ways in which BIM information is used, shared and managed</p> <p><b>M6</b> Evaluate the roles required to successfully deliver a BIM project</p>	

## Unit 15: Principles of Refurbishment

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>15 Principles of Refurbishment</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Reuse, Recycle, Refurb</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Building Refurbishment Report</b> (2000-2500 words)</li><li>• <b>Construction Information Package</b></li></ul>	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Explain the need for refurbishment	
<b>LO2</b> Compare different options for refurbishment projects	
<b>LO3</b> Analyse the refurbishment process	
<b>LO4</b> Prepare a proposal for a refurbishment scheme.	

## Assignment Brief and Guidance

You are working as an Assistant Building Surveyor for a local construction firm. The firm has a long history in new-build projects, but recognises that there is increasing demand for the refurbishment of existing buildings for new use and wishes to begin undertaking these types of project. To prepare the firm to move into refurbishment projects, they would like you to prepare **Report** that will use an example project to:

- Explain why refurbishment may be required throughout a building lifecycle; discussing the functional, physical, social and legal concepts of obsolescence. Compare the different forms of obsolescence and how they contribute to the need for refurbishment.
- Explain the benefits and challenges of refurbishment, in relation to sustainability.

Based on your selection of an example project, your employer asks that you:

- Illustrate the different level of refurbishment and the explain the scale of work required in different levels of refurbishment. Using the example project, you should analyse a range of different options, and analyse the refurbishment process; analysing the relationship between the different stages, as it will apply to a selected approach to refurb.
- Discuss the planning and building regulations approvals in relation to refurbishment.

For your selected example project, your employer also asks that you undertake the work necessary to refurbish the building and produce the relevant information and justify your proposal in relation to issues of obsolescence. This will require:

- Interpretation of a brief to produce outline drawings, specification and budget for the scheme.
- Prepare planning and building regulation applications for your proposed scheme.
- Producing detailed working drawings and specifications.

## Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Explain the need for refurbishment		<b>LO1, LO2, and LO3</b>  <b>D1</b> Evaluate the refurbishment process and the options available in terms of societal need, environmental impact, time, cost and quality
<b>P1</b> Explain why properties will require refurbishment throughout their lifecycle  <b>P2</b> Discuss economic, functional, physical, social, and legal obsolescence  <b>P3</b> Explain the benefits and challenges of refurbishment in regard to sustainability	<b>M1</b> Compare different forms of obsolescence and how they may contribute to the need for refurbishment	
<b>LO2</b> Develop a graphic design brief, to meet client needs in a given context.		
<b>P4</b> Illustrate the different levels of refurbishment intervention  <b>P5</b> Explain the scale of refurbishment options	<b>M2</b> Analyse a range of refurbishment options and interventions for a given scenario	
<b>LO3</b> Analyse the refurbishment process		
<b>P5</b> Analyse the refurbishment process  <b>P6</b> Discuss the processes of planning and building regulations approval in relation to refurbishment	<b>M3</b> Analyse the stages of a refurbishment project and discuss the interrelationship between them	
<b>LO4</b> Prepare a proposal for a refurbishment scheme		<b>D2</b> Justify a refurbishment proposal, highlighting how it addresses issues of obsolescence
<b>P8</b> Interpret a given scenario and produce outline drawings for a refurbishment scheme  <b>P9</b> Produce an outline specification and budget costs for a refurbishment scheme  <b>P10</b> Prepare building regulation and planning application documentation for a refurbishment scheme	<b>M4</b> Produce detailed working drawings and specification	

## Unit 16: Principles of Alternative Energy

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>16 Principles of Alternative Energy</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• <b>Online Video Presentation</b> (15-20 minutes)</li> <li>• <b>Downloadable PDF Case Study</b> (1000-1500 words)</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Discuss types of alternative energy system, and how they differ from common systems in use today</p> <p><b>LO2</b> Evaluate the factors that inform the selection of a renewable energy system in relation to a specific installation</p> <p><b>LO3</b> Present a strategy for a cost-effective upgrade to an existing building, utilising an appropriate form of alternative energy</p> <p><b>LO4</b> Describe ways in which different forms of alternative energy address broader environmental issues and provide sustainable solutions.</p>	

## Assignment Brief and Guidance

You are working as an assistant building services designer for a small company that specialises in developing alternative energy solutions. The company is planning to redevelop their website to provide more information about the process and features of alternative energy. As part of this, they wish to have an online video/presentation that will allow potential customers to understand both the opportunities and benefits of implementing an alternative energy solution.

The managing director has asked you to develop the content for the online video. This should:

- An explanation of purpose and principles associated with different forms of renewable energy, comparing them to traditional forms.
- Analysis of the environmental impact of existing and renewable technologies, and an evaluation of renewables in addressing environmental issues.
- Evaluation of the factors that influence the selection of a renewable energy system including a description of advances in renewables to meet specific installation needs.
- Description of the ways that alternative energy addresses broad environmental issues, comparing different technologies and their addressing of broad environmental and sustainability issues.
- Analysis of how specific renewable energy solutions meet (or contribute to) environmental initiatives (e.g. Kyoto Protocol, carbon trading, local/global targets).

To accompany the online presentation, you are asked to develop a case study for the cost-effective alternative energy upgrade to an existing building: This should include:

- Select an alternative energy system appropriate to the site, and present the strategy for integrating the system.
- Justify the selection and design of the alternative energy system, providing information on cost and design factors.

## Instructions and guidance to candidates

Your video presentation should be submitted as an MPEG4 file on a USB 'thumb' drive or as a YouTube link. The video may include graphics, charts, video clips, etc. and must have a voice-over explaining the content. You must ensure that you include 'credits' section (ideally at the end of the video), that provides credits for any material sourced from others.

Your Downloadable PDF Case Study should be formatted as an A4 document and submitted as both a hard-copy and on a USB 'thumb' drive or a download link.

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Discuss types of alternative energy system, and how they differ from common systems in use today		<b>D1</b> Analyse current and advanced renewable technologies, evaluating their effectiveness and impact on the environment as compared to existing non-renewable technologies
<b>P1</b> Explain the operating principles and purpose of the main types of renewable energy technology in current use  <b>P2</b> Compare renewable technologies to existing non-renewable energy systems	<b>M1</b> Analyse the operating principles, and environmental impact of, existing and advanced renewable technologies.	
<b>LO2</b> Evaluate the factors that inform the selection of a renewable energy system in relation to a specific installation		
<b>P3</b> Evaluate the factors affecting the selection of a renewable energy system  <b>P4</b> Describe advances in renewable energy technology and how they meet the needs of a specific installation	<b>M2</b> Justify the selection of a renewable energy system.	<b>D2</b> Evaluate the factors that inform the selection of a renewable energy system in relation to a specific installation
<b>LO3</b> Present a strategy for a cost-effective upgrade to an existing building, utilising an appropriate form of alternative energy		
<b>P5</b> Select appropriate renewable technology system for an existing building  <b>P6</b> Present a strategy, for an existing building, to integrate a form of alternative energy	<b>M3</b> Justify design decisions based on external, cost and design factors.	

Pass	Merit	Distinction
<b>LO4</b> Describe ways in which different forms of alternative energy address broader environmental issues and provide sustainable solutions		
<b>P7</b> Describe ways alternative energy technology addresses broader environmental issues	<b>M4</b> Compare how different environmental technologies address broader environmental and sustainability issues.	<b>D3</b> Analyse how specific renewable technologies meet the requirements of environmental initiatives such as the Kyoto Protocol, carbon trading and global and local government targets



## Unit 17: Principles of Public Health Engineering

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>17 Principles of Public Health Engineering</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Marketing Public Health</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Presentation</b> (20-25 minutes)	
<b>Report</b> (1000-1500 words)	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Explain the different types of domestic water services systems and above ground drainage that serve large commercial and complex buildings</p> <p><b>LO2</b> Identify relevant design considerations for buildings when selecting water, drainage pipework, plant and equipment</p> <p><b>LO3</b> Develop sustainable design strategies for public health engineering</p> <p><b>LO4</b> Design and specify water and sanitation services for large non-domestic buildings</p>	

## Assignment Brief and Guidance

You are employed as an Assistant Public Health Technician for a multi-national engineering firm. The firm works across many different sectors (commercial, industrial, civil, etc.) and has had great success with the structural and civil engineering services they provide. They now recognise the need to build up their building services business; with particular emphasis on public health engineering.

To support this, the firm has appointed a marketing consultant who will help to develop a strategy for promoting public health engineering part of the business. The managing director has asked you to prepare a range of material to assist the marketing consultant in understanding the nature of public health engineering, principles and processes.

You are asked to prepare a presentation for the marketing consultancy, which should include:

- Identify the main hot & cold water and sanitation systems found in commercial buildings and describe the types of plan used.
- Illustrate the way that hot & cold water and sanitation systems work.
- Explain the relevant legislation and codes of practice related to the design of water and sanitation systems and identify the design considerations of the design of water and sanitation systems.
- Analyse the relationship between design considerations and legislative requirements.
- Based on a selection of building projects, critically analyse different water and sanitation systems and plant choices; with particular emphasis on how the choices impact on the buildings' performance and construction.
- Identify the economic and legislative drivers for sustainability in public health engineering, and explain the parameters that inform the design of water and sanitation systems.

In addition, you are asked to prepare a **report** that illustrates the development of a design proposal for a water and sanitation strategy for a large non-domestic building. This report should include:

- A design strategy for a public health engineering installation, comparing sustainable strategies for the proposed project
- Drawings and specifications for water and sanitation services, with calculations for the required plant and pipe sizes.
- An evaluation of the impact of integrating sustainable solutions in the proposal.

## Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Explain the different types of domestic water services systems and above ground drainage that serve large commercial and complex buildings</p>		<p><b>D1</b> Critically analyse different water and sanitation systems and plant choices, explaining how such choices may impact on the building's construction and performance</p>
<p><b>P1</b> Identify the main hot &amp; cold water and sanitation systems for commercial buildings</p> <p><b>P2</b> Describe the main plant items for water and sanitation systems</p>	<p><b>M1</b> Illustrate the operation of a hot &amp; cold water and sanitation system for a given building type</p>	
<p><b>LO2</b> Identify relevant design considerations for buildings when selecting water, drainage pipework, plant and equipment</p>		
<p><b>P3</b> Explain the current legislation and codes of practice that influence the design and selection of water and sanitation systems</p> <p><b>P4</b> Identify relevant design fundamentals that are needed in order to undertake the design of water and sanitation schemes for buildings</p>	<p><b>M2</b> Analyse the relationship between design fundamentals and legislative requirements needed for an effective public health design of a building</p>	

Pass	Merit	Distinction
<p><b>LO3</b> Develop sustainable design strategies for public health engineering</p>		<p><b>D2</b> Evaluate the impact of incorporating a sustainable public health scheme within a building design</p>
<p><b>P5</b> Identify the main drivers, both economic and legislative, for sustainable design in public health engineering</p> <p><b>P6</b> Produce a design strategy for a public health engineering installation in a given context</p>	<p><b>M3</b> Compare sustainable design strategies for public health engineering in relation to a given context</p>	
<p><b>LO4</b> Design and specify water and sanitation services for large non-domestic buildings</p>		
<p><b>P7</b> Explain the parameters that inform the design of public health engineering services for a building</p> <p><b>P8</b> Produce drawings and specification for water and sanitation services in a large non-domestic building</p>	<p><b>M4</b> Calculate the required plant and pipe sizes for a public health engineering design</p>	

## Unit 18: Civil Engineering Technology

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>18 Civil Engineering Technology</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Apprentice Training</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• Four (4) <b>Training Videos</b> (5-minutes each)</li><li>• <b>Download File</b> of supporting information</li></ul>	

## Unit Learning Outcomes

**LO1** Explain the methods and techniques used in civil engineering for earthworks and substructures

**LO2** Present a site safety plan, risk assessment and method statement for a given civil engineering activity

**LO3** Evaluate a given civil engineering problem and propose a solution

**LO4** Prepare a design proposal for a new infrastructure project.

## Assignment Brief and Guidance

You are working as an Assistant Site Supervisor for a civil engineering contractor. The company has recently appointed a number of apprentices. The Lead Civil Engineer has asked you to prepare a series of short training videos that the apprentices can use to gain an insight into key areas of civil engineering technology. Each video should be about 5 minutes long and include images, graphics, drawings, and voice over; to explain the specific concepts covered in the video.

The videos are intended to cover:

**1 Earthwork & Substructure**, should include:

- A discussion of earthworks activities, equipment and techniques; describing the methods used to create complex foundations, piling and drainage works.
- A description of the methods used in culvert construction, underpass construction and provision for utilities.
- An analysis of methods and techniques for complex earthmoving operations and deep excavations; as well as an evaluation of methods to deal with ground a slope stability.

**2 Health & Safety**, should include:

- Identification of hazards, risks and safety arrangements necessary for excavations, working in confined spaces, working on substructures and working within temporary work on highways.
- A step by step explanation of the development of a site safety plan, risk assessment and method statement for a given civil engineering activity; with a justification for the way that these have been developed.
- A discussion of the health & safety legislation and codes of practice for civil engineering activities.

**3 Problems & Solutions**

- Evaluation of the environmental, quality, geotechnical and economic contexts of a selected civil engineering problem.
- Based on the above, propose a solution; illustrating how environmental, geotechnical, quality and economic contexts of the problem are addressed.

#### 4 Infrastructure Design

- Describe the methods and techniques used in highway design.
- (Based on a design proposal that you have developed) Give an overview of a civil engineering design proposal for a new infrastructure project; including an analysis of the methods and techniques used to construct bridge foundations, flexible highway construction and related geotechnical parameters.
- (In relation to your proposed infrastructure solution) Justify the selection of specific features used in the design proposal.

In addition to the training videos, you are to provide a **Download File** that will include PDF versions of:

- Drawings
- Specifications
- Site safety plan
- Risk assessment
- Method Statement

#### Instructions and guidance to candidates

Each training video should be submitted as an MPEG4 file, on a USB 'thumb' drive or uploaded to a cloud service and the URL link provided.

An accompanying download file should be made available, and include PDF versions of the drawings, specifications, site safety plan, risk assessment and method statement.

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Explain the common methods and techniques used in civil engineering earthworks and substructures		<b>D1</b> Evaluate methods and techniques used to deal with issues of ground and slope stability
<b>P1</b> Discuss earthworks activities, equipment and techniques  <b>P2</b> Describe methods and techniques used to create complex foundations, piling works and drainage works  <b>P3</b> Describe methods and techniques used in culvert construction, underpass construction and provision for utilities	<b>M1</b> Analyse methods and techniques used in large complex earthmoving operations and deep excavations	
<b>LO2</b> Present a site safety plan, risk assessment and method statement for a given civil engineering activity		<b>D2</b> Justify a site safety plan, risk assessments and method statements report for activities related to a given civil engineering project
<b>P4</b> Identify the hazards, risks and safety arrangements for excavations, working in confined spaces, working on structures and for working within temporary works on highways  <b>P5</b> Develop and present a site safety plan, risk assessments and method statements for a given civil engineering activity	<b>M2</b> Discuss Health & Safety legislation and codes of practice related to civil engineering sites	



Pass	Merit	Distinction
<p><b>L03</b> Evaluate a given civil engineering problem and propose a solution</p>		<p><b>L03 and L04</b></p> <p><b>D3</b> Justify the selection of specific features in the development of a civil engineering solution to a given problem</p>
<p><b>P6</b> Evaluate the environmental, quality, geotechnical and economic contexts of a given civil engineering problem</p> <p><b>P7</b> Propose a solution to a given civil engineering problem</p>	<p><b>M3</b> Illustrate how the environmental, geotechnical, quality and economic contexts of a problem are addressed through a proposal</p>	
<p><b>L04</b> Prepare a design proposal for a new infrastructure project</p>		
<p><b>P8</b> Describe methods and techniques used in highway design</p> <p><b>P9</b> Develop a civil engineering design proposal for a new infrastructure project</p>	<p><b>M4</b> Analyse methods and techniques used to create bridge foundations, flexible highway construction foundation criteria and related geotechnical parameters</p>	

## Unit 19: Principles of Electrical Design & Installation

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>19 Principles of Electrical Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Building Services Fair</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• 4 – A1 <b>Presentation Boards</b></li><li>• 10-minute <b>Presentation</b></li></ul>	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Discuss the fundamentals of electricity, magnetism, transformers and circuits <b>LO2</b> Analyse the performance, operation and control of AC and DC motors <b>LO3</b> Explain the different methods of electricity distribution <b>LO4</b> Prepare a proposal for a non-domestic lighting installation.	

## Assignment Brief and Guidance

You are working for an Electrical Services consultancy that specialises in non-domestic projects. The company is being merged with a large building contractor, to form a new construction services firm. In order for the different parts of the combined business to understand what each team does, the entire company is going to hold a 'services fair' in which different teams will present their work and working practices at a 'stand' in the company foyer.

The managing director has asked you to prepare the Electrical Services 'stand' and be on hand to answer questions about the work that the Electrical Services team undertakes. This will require a series of 4 A1 presentation boards:

### **1 Fundamentals of Electricity, Magnetism, Transformers & Circuits**; this will:

- Explain the performance of electrical and magnetic circuits; including transformers.
- Assessment of the health & safety issues associated with electrical and magnetic circuits.
- Illustration of a simple design of an electrical circuit for a non-domestic building.

### **2 AC/DC Motors**, this will:

- Analyse the principles that underpin the operation and control of AC and DC motors;
- Show the calculation of the performance of AC and DC motors.
- For a given non-domestic application, select an AC or DC motor, and compare the suitability of motors for the application.

### **3 Electricity Distribution**, this will:

- Explain the methods, and describe the equipment used, for different types of electrical distribution.
- Show the calculation of electrical load for a non-domestic building, and select a suitable distribution panel.

To develop the final board, you will need to produce drawings and details for electrical distribution and lighting of a non-domestic installation; illustrating circuits and distribution.

### **4 Proposal**, this will:

- Discuss the principles that underpin the design and installation requirements of lighting for a non-domestic project; using drawings and details.

Using the display of the Presentation Boards, you will have approximately 10 minutes to give a **Presentation** that will provide an overview of the boards and:

- Evaluate electrical and magnetic circuits for a non-domestic installation.
- Evaluate the relationship between lighting design and electrical circuit design.

### **Instructions and guidance to candidates**

Presentation boards should seek to use graphic communication, as much as possible, and avoid large blocks of text. The aim is to provide clear, concise, and compelling information that can be quickly engaged. Please ensure that there is a clear 'narrative' structure (allowing the viewer to understand how to read the material, and in which order) to the presentation boards.

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Discuss the fundamentals of electricity, magnetism, transformers and circuits		<b>D1</b> Evaluate electrical and magnetic circuits for a given non-domestic installation
<p><b>P1</b> Explain the performance of electrical and magnetic circuits, including transformers</p> <p><b>P2</b> Assess the Health &amp; Safety issues associated with electrical and magnetic circuits</p>	<b>M1</b> Design a simple electrical circuit for a given non-domestic building	
<b>LO2</b> Analyse the performance, operation and control of AC and DC motors		<b>D2</b> Compare the suitability of AC and DC motors for a given context
<p><b>P3</b> Analyse the principles that underpin the operation and control of AC and DC motors</p> <p><b>P4</b> Calculate the performance of AC and DC motors</p>	<b>M2</b> Select a motor, based on performance needs, for a given non-domestic application	
<b>LO3</b> Explain the different methods of electricity distribution		<b>LO3 and LO4</b> <b>D3</b> Evaluate the relationship between lighting design and electrical circuit design for a non-domestic installation
<p><b>P5</b> Explain different methods of electricity distribution</p> <p><b>P6</b> Describe the equipment used for different methods of electrical distribution</p>	<b>M3</b> Calculate the electrical load for a given non-domestic building, in order to select a suitable distribution panel	
<b>LO4</b> Prepare a proposal for a non-domestic lighting installation		
<p><b>P7</b> Discuss the principles that underpin the design and installation requirements of lighting applications</p> <p><b>P8</b> Produce drawings and details for electricity distribution and lighting for a non-domestic installation</p>	<b>M4</b> Illustrate circuits and distribution as part of a design proposal	

## Unit 20: Principles of Structural Design

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>20 Principles of Structural Design</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Structural Design Job Application</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Structural Design</b> (including drawings &amp; specifications)</li><li>• <b>Time-constrained Exam</b> (3 hours to complete 14 questions)</li></ul>	
<b>Unit Learning Outcomes</b>	
<b>L01</b> Calculate bending moments and shear forces for simply supported steel and concrete beams	
<b>L02</b> Determine deflection for simply supported steel beams	
<b>L03</b> Calculate the axial load carrying capacity of steel and reinforced concrete columns	
<b>L04</b> Explore design methods for steel, reinforced concrete beams and columns.	

## Assignment Brief and Guidance

You have been shortlisted for the position of Structural Design Technician in a small engineering practice. As part of the interview process, you are asked to complete a series of calculations, prepare a design structural design proposal and answer questions.

The first part of the exam, which you will complete over the course of 2 weeks, you are required to develop a design solution for the given scenario. To achieve this, you will:

- Develop a design solution that includes beam and column designs
- Produce drawings and specifications for your structural solution.
- Evaluate possible alternative solutions; discussing the benefits and challenges for each.
- Assess the use of BIM in the production of accurate structural design information and the potential benefits of a collaborative model for structural design.

The final part of the exam will be undertaken at the practice's office. You are required to complete the following; based on the attached drawings:

- Q1 – Calculate the bending moment and shear force on the simply supported steel beam with point loads.
- Q2 – Calculate the bending moment and shear force on the simply supported steel beam with uniformly distributed loads.
- Q3 – Discuss the statutory requirements for structural design safety
- Q4 – Produce valid factors of safety for live loads, dead loads and imposed loads; based on current codes of practice and regulations.
- Q5 – Evaluate how maximum bending moments determine steel beam selection; based on current codes, approved documents with reference to economics and safety.
- Q6 – Determine the deflection in simply supported steel beams with point loads
- Q7 – Determine the deflection in simply supported steel beams with uniformly distributed loads.
- Q8 – Explain how deflection in beams affects structural stability.
- Q9 – Analyse support methods and their influence on deflection in fixed structures.
- Q10 – Describe the concepts of slenderness ratio and effective length
- Q11 – Determine the axial load bearing capacity of steel columns
- Q12 – Determine the axial load bearing capacity of reinforced concrete columns.
- Q13 – Analyse the load carrying capacity, size, weight and corrosion resistance properties of different materials used for beams and columns for fixed structures
- Q14 – For the given scenario, assess the most effective support method; in terms of ease and speed of construction, cost, safety and environmental factors.

(For the questions above, you are able to use building regulation documents, standard structural section sizing charts, etc.)

**Instructions and guidance to candidates**

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)



## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Calculate bending moments and shear forces for simply supported steel and concrete beams		<b>D1</b> Evaluate how maximum bending moments determine steel beam selection using current codes of practice and approved documents in terms of economics and safety.
<b>P1</b> Determine the following by calculations and diagrams: bending moments and shear force in simply supported steel beams with point loads and uniformly distributed loads  <b>P2</b> Discuss the statutory requirements to ensure safety in structural designs	<b>M1</b> Produce valid factors of safety for live loads, dead loads and imposed loads using current codes of practice and building regulations	
<b>LO2</b> Determine deflection for simply supported steel beams		<b>LO2 and LO3</b> <b>D2</b> Assess the most effective support method for a given scenario, in terms of ease and speed of construction, economics, safety and environmental factors
<b>P3</b> Determine deflection in simply supported steel beams with point loads and a uniformly distributed load  <b>P4</b> Explain how deflection in beams affects structural stability	<b>M2</b> Analyse different support methods and their effect on deflection in fixed structures	
<b>LO3</b> Calculate the axial load carrying capacity of steel and reinforced concrete columns		
<b>P5</b> Describe the concepts of slenderness ratio and effective length  <b>P6</b> Determine the axial load carrying capacity of steel columns and reinforced concrete columns	<b>M3</b> Analyse the load carrying capacity, size, weight and corrosion resistance properties of different materials used for beams and columns in fixed structures	

Pass	Merit	Distinction
<b>L04</b> Explore design methods for steel, reinforced concrete beams and columns		<b>D3</b> Assess the use of Building Information Modelling in the production of accurate structural design information and the collaborative environment of structural design
<b>P7</b> Develop a design solution, including beam design and column design, for a given scenario  <b>P8</b> Produce drawings and specifications in support of a structural design solution	<b>M4</b> Evaluate the use of an alternative material in achieving a design solution, discussing the benefits or challenges associated	

## Unit 21: Site Supervision & Operations

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>21 Site Supervision &amp; Operations</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Site Report</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
A4 PDF <b>Report</b> (3000-3500 words)	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Evaluate construction information to determine quality requirements	
<b>LO2</b> Prepare a report on defects and recommended remedial actions	
<b>LO3</b> Assess a pre-construction Health & Safety plan for a given construction project, in relation to local and national regulations	
<b>LO4</b> Discuss methods for evaluating and improving the performance of site staff.	

## Assignment Brief and Guidance

You are working as a Site Engineering Technician, for a medium-sized civil engineering contractor. You have been asked to prepare a **report** on site operations for a project that is nearing completion. In this report, you are asked to:

- define the quality requirements for the project based on drawings and specifications;
- explore the relationship between quality and statutory requirements;
- evaluate the impact of changes in project quality necessary to meet statutory requirements;
- identify and produce a schedule of defects for the project;
- explore remedial actions to address defects;
- discuss the difference between latent and patent defects and their implication for remedial action;
- ascertain the implications of patent defects, identified through schedule of defects and construction information, for defects liability.

In addition, you are asked to review the preconstruction health & safety plan for the project and include in your **report** a:

- discuss the importance of construction design management and the local and national health & safety requirements for construction projects;
- evaluate the impact of health & safety violations on construction projects;
- provide examples of methods for promoting a positive approach to health & safety on site;

Finally, your **report** should:

- describe the methods for evaluating team member performance and recommend training and development strategies to improve performance;
- evaluate the relationship between equality and diversity and performance management;
- analyse the relationship between performance management and health & safety legislation.

## Instructions and guidance to candidates

Your report should be submitted as an A4 PDF document. You are encouraged to include drawings, diagrams, charts, photos, etc. that may support the work within the report.

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Evaluate construction information to determine quality requirements		
<b>P1</b> Define quality requirements for a given project through the review of drawings, specifications and schedules <b>P2</b> Explore the relationship between project quality requirements with statutory requirements	<b>M1</b> Evaluate the impact of potential changes in project quality requirements that are necessary to meet statutory requirements	
<b>L02</b> Prepare a report on defects and recommended remedial actions		
<b>P3</b> Identify defects for a given construction project and produce a schedule of defects <b>P4</b> Explore remedial actions necessary to address identified defects	<b>M2</b> Discuss the difference between patent and latent defects and their associated implications for remedial actions	
<b>L03</b> Assess a pre-construction Health & Safety plan for a given construction project, in relation to local and national regulations		
<b>P5</b> Discuss the importance of construction design management for ensuring site safety <b>P6</b> Discuss local and national requirements for Health & Safety in relation to construction projects	<b>M3</b> Evaluate the impact of Health & Safety violations on construction projects	
		<b>D1</b> Review construction information and schedules of defects to ascertain patent defects and the implication for defects liability
		<b>D2</b> Give examples of methods for promoting a positive approach to Health & Safety for a construction team

Pass	Merit	Distinction
<b>L04</b> Discuss methods for evaluating and improving the performance of site staff		<b>D3</b> Analyse the relationship between performance management and Health & Safety legislation
<b>P7</b> Describe the methods for evaluating the performance of team members  <b>P8</b> Recommend training and development strategies to improve performance	<b>M4</b> Evaluate the relationship between equality and diversity and performance management in the construction industry	

## Unit 22: Group Project (Pearson-set)

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief 1

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>22 Group Project (Pearson-set)</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Changing Technologies in the Construction Industry</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
The submission is comprised of: <ul style="list-style-type: none"><li>● <b>Team Report</b> (1000-1500 words)</li><li>● <b>Project Management File</b> (1000-1500 words)</li><li>● <b>Tender Package</b></li></ul>	

## Unit Learning Outcomes

**LO1** Assess individual and group skills in order to allocate roles within a collaborative team

**LO2** Plan a construction project, based on the Pearson-set theme, in collaboration with others to ensure good practice in resource management, staffing and project scheduling

**LO3** Prepare tender documentation; undertaking work appropriate to a defined role within a team

**LO4** Evaluate own work, and the work of others, in a collaborative team.

## Assignment Brief and Guidance

You are among a group of newly appointed staff in a large construction firm. The firm specialises in design-build projects; meaning they develop a good deal of the construction information, for tender packages, in-house. As part of your induction programme, the company has assigned you and a group of colleagues the responsibility of developing the tender package for a small project and exploring *how technology is changing construction*. As part of this, you will also be reporting on aspects of team-working.

As individuals you are asked to produce a **Team Report**. This should include:

- An evaluation of your own skills, and the skills of others in the team, based on a skills audit. This should consider the technologies that you and your team have knowledge of using in a project. Based on your skills audit, you will need to define roles and allocate these to the members within the team. You should justify the allocation of the roles, with regard to skills and project aims; reflecting on how technologies have influenced your decisions.
- Throughout the course of the project, you will need to continuously review your own work and record this; evaluating your working practice in relation to other members of the team and looking for examples of good practice in your own work and that of others. To support this, you should undertake a personality profile test (see list of resources below) and evaluate your results in relation to your working practices.
- Finally, you will need to critically evaluate the success of your collaborative project through a consideration of your own and colleagues working practices, based on allocated roles and personality profiles. You should, particularly in consideration of roles, consider the way that knowledge of and use of technologies has informed roles and practices.

The above will be developed as you undertake the project, to produce a tender package related to a small project. The project, as set out in the attached sketches, is a small industrial building; used for the maintenance of vehicles.



You are asked to prepare a **Project Management File**, which should include:

- A project plan, which will illustrate the resource planning (physical and human) and time planning to ensure that the tender package is produced within the time allocated. In this, you will need to interpret events in the plan to indicate milestones, and possible project risks.
- As you develop your tender package, you are asked to critically evaluate the relationship between project planning and tender documentation, highlighting the ways in which the development of information responds to the project plan; and considering the way technologies may further influence this relationship. This should be discussed within the Project Management file.

The **Tender Package** is to include:

- Construction drawings and specifications, a cost plan and a pre-construction health and safety method statement. In preparing these materials, consideration should be given to the way that technologies inform the development of construction information.
- You are specifically asked to evaluate the way in which BIM may provide greater efficiency in the collaborative development of tender documentation. Your views on this should be included within your Team Report.

### **Instructions and guidance to candidates**

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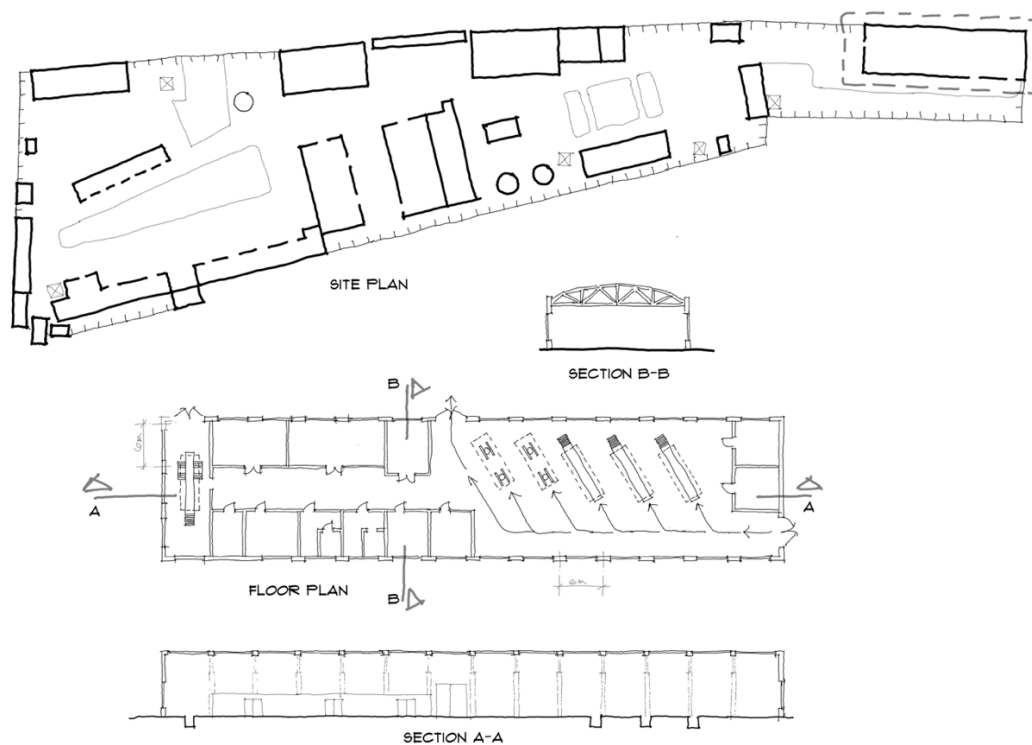
## Supporting Resources

**Personality Testing** – <http://www.humanmetrics.com/cgi-win/jtypes2.asp>

You will find many different types of personality testing available online. The test listed above is simple and uses a recognised format. You may use other forms of personality testing, provided all members of your team use the same testing system.

## Project Sketches

The sketches above are available to download and form the basis of the tender package that you will develop. You will need to determine the various materials and structural systems to be used. You are encouraged to consider the use of new construction methods and new technologies.



## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction	
<p><b>LO1</b> Assess individual and group skills in order to allocate roles within a collaborative team</p>			
<p><b>P1</b> Evaluate own skills and the skills of others through skills auditing and review.</p> <p><b>P2</b> Develop role descriptions and responsibilities within a team.</p>	<p><b>M1</b> Discuss the allocation of roles within a collaborative team to meet overall project needs.</p>		<p><b>D1</b> Justify the allocation of roles and responsibilities within a team, recognising individual skills and ambitions vs project requirements.</p>
<p><b>LO2</b> Plan a construction project, based on the Pearson-set theme, in collaboration with others to ensure good practice in resource management, staffing and project scheduling</p>			
<p><b>P3</b> Develop a project plan to ensure successful achievement of completed project.</p> <p><b>P4</b> Illustrate resource planning (both physical and human) as well as time planning.</p>	<p><b>M2</b> Interpret events and activities in a project plan in order to indicate milestones, and risks.</p>		<p><b>LO2 and LO3</b></p> <p><b>D2</b> Critically evaluate the relationships between project planning and tender documentation, highlighting ways in which tender information responds to project planning.</p>
<p><b>LO3</b> Prepare tender documentation; undertaking work appropriate to a defined role within a team</p>			
<p><b>P5</b> Develop construction drawings and specifications.</p> <p><b>P6</b> Prepare a cost plan.</p> <p><b>P7</b> Produce a preconstruction health &amp; safety method statement.</p>	<p><b>M3</b> Evaluate the ways in which Building Information Modelling can provide greater efficiency in collaborative preparation of tender documentation.</p>		

Pass	Merit	Distinction
<p><b>LO4</b> Evaluate own work, and the work of others, in a collaborative team</p>		<p><b>D3</b> Critically evaluate the success of a project by considering individual and group working practices in relation to assigned roles and personality profiles.</p>
<p><b>P7</b> Undertake a continual review of their own work, recording this throughout the project.</p> <p><b>P8</b> Evaluate their own working practices in relation to that of other members of the team, identifying areas of good practice.</p>	<p><b>M4</b> Evaluate their own personality profile in relation to your working practices.</p>	

## Unit 23: Contracts & Management

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>23 Contracts &amp; Management</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Briefing</b> (presentation) – 20-minutes, and</li><li>• Hardcopy of revised <b>standard contract and Terms &amp; Conditions</b></li></ul>	

## Unit Learning Outcomes

**LO1** Discuss the requirements for a contract in meeting stakeholders' interests

**LO2** Determine the criteria for the selection of a contract

**LO3** Analyse different types of contract and their application to the built environment

**LO4** Select and prepare an appropriate form of contract for a specific project, specifying the terms and conditions.

## Assignment Brief and Guidance

You are employed as an Assistant Project Manager for a mid-sized contractor that works in both the public and private sector, on a range of different project types. The company has a new project for a new development company. The developer has only, previously, been involved in small residential projects but are now moving to develop commercial projects and have ambitions to explore public sector projects. As your company sees great opportunity in working with this developer, in the future, your managing director has decided to support them to enhance their understanding of contracts and management for construction projects. To this end, you have been asked to prepare a **briefing** for the head of the developer's project team.

Your briefing is intended to:

- Explore the contractual requirements for a private sector client and explain the requirements for a public body (with specific reference to an infrastructure project). In addition, a comparison of the different contractual requirements between public and private will provide a grounding for the evaluation of a public sector contract and legislative compliance.
- Assess how time cost and quality affect the selection of a contract and evaluate the ways in which; specifically, time and quality influence cost.
- Using an example project, analyse the selection criteria for a contract that will satisfy client requirements.
- Using the same project, evaluate the risks for stakeholders.
- For a selected project, revise a standard contract to meet client needs and present a rationale for the terms & conditions (T&C). Compare how T&C of similar contract may meet client needs and justify the selection of a contract to meet the strategic values of the client. (Your **revised standard contract and T&C** should be provided as hard-copy with the presentation)
- Discuss how collaboration between contractors and sub-contracts may influence contractual arrangements.

The **briefing** should be given as a PowerPoint (or similar) presentation, making use of diagrammes, charts, etc. that will help to explain contracts and relationships between parties. The briefing is expected to be about 20-minutes long. You should have copies of your **revised standard contract and T&C** available during the presentation.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Discuss the requirements for a contract in meeting stakeholders' interests.		<b>D1</b> Critically evaluate the contractual requirements for a public body in compliance with legislation
<b>P1</b> Explore the contractual requirements of a project for a private client  <b>P2</b> Explain the contractual requirements for a public body for an infrastructure project	<b>M1</b> Contrast the contractual requirements of a public and a private stakeholder for a major project	
<b>L02</b> Determine the criteria for the selection of a contract.		<b>D2</b> Evaluate a project in terms of risk for all stakeholders
<b>P3</b> Assess how time, cost and quality affect the selection of a contract  <b>P4</b> Evaluate the ways in which time and quality affect the cost of a project	<b>M2</b> Analyse a project in terms of the selection criteria for a contract that satisfies the requirements of a client	
<b>L03</b> Analyse different types of contract and their application to the built environment.		<b>D3</b> Justify the selection of a contract in meeting the strategic values of a client.
<b>P5</b> Analyse the factors that influence the selection of a contract used to control and manage a project	<b>M3</b> Compare forms of standard contracts in terms of meeting a balanced risk	
<b>L04</b> Select and prepare an appropriate form of contract for a specific project, specifying the terms and conditions.		
<b>P6</b> Revise a standard contract in meeting the requirements of a client  <b>P7</b> Present the rationale for defining selected terms and conditions in the preparation of a contract	<b>M4</b> Compare the terms and conditions of similar contracts in meeting clients' requirements  <b>M5</b> Discuss how collaboration between contractors and subcontractors influence contractual arrangements	



## Unit 24: Project Management

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>24 Project Management</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
4 <b>Blog Posts</b> (approx. 3000-3500 words in total)	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Compare project management theories, practices and standards; and their appropriateness for different types of project	
<b>LO2</b> Discuss the roles of the major stakeholders in a construction project and how their needs are managed by the project management team	
<b>LO3</b> Specify the attributes and competencies of a project manager in leading complex construction works	
<b>LO4</b> Develop a project strategy plan that defines the key policies, procedures and priorities for a complex construction project.	

## Assignment Brief and Guidance

You have been employed by a local project management firm, specialising in project management for complex construction projects. The firm is looking to expand its client-base and wishes to develop a new section of the website that will focus on the importance and value of project management. This will be based on a series of **blog posts** that will help potential clients understand the services that a project manager can provide, the role of the project manager, what makes a good project manager, and how project management supports construction.

The head of the marketing team has asked you to prepare a series of **blog posts** that will be featured on the company website. The topics suggested are:

- **What is project management?**

- Analysis of the theories that underpin project management for different types of project.
- Exploring the development of project management as a construction-related discipline and discussing the need for professional recognition and standards for project management.
- Discussion of the types of project and project management in construction.

- **Who is involved in project management?**

- Review the key stakeholder relationships and their influence on a project.
- Assess the importance of stakeholder communications and collaboration in meeting project goals.
- Evaluate stakeholder decision-making processes for complex projects.

- **What to look for in a project manager**

- Discuss the key responsibilities of the project manager role
- Assess the attributes, competencies and managerial skills for a project manager
- For different types of construction project, compare the duties and qualities required of a project manager.

- **Project management in practice**

- Examine key project management processes and social responsibilities for a complex project
- Prepare a project management plan, with an emphasis on ensuring sustainability
- Critically evaluate the ways that project management can be enhanced through adoption of BIM.
- Present a Project Execution Plan that includes scope, objectives, human and resource planning, and key priorities for a complex project.

You are asked to use diagrams, charts, graphics, etc. to help explain the various aspects of project management, listed above. You are asked to submit your blog posts via an only blogging platform (e.g. blogger, wordpress, or similar) and that consider the amount of text vs. graphics (can you use an illustration, chart or diagram to explain something rather than write about it?) and page layout.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Compare project management theories, practices and standards; and their appropriateness for different types of project</p>		<p><b>D1</b> Analyse the theories that underpin project management for different types of complex construction projects</p>
<p><b>P1</b> Discuss the types of projects and project management in the context of construction activities.</p> <p><b>P2</b> Discuss the need for professional recognition and standards for project management</p>	<p><b>M1</b> Explore the development of project management as a discipline within the construction industry</p>	
<p><b>LO2</b> Discuss the roles of the major stakeholders in a construction project and how their needs are managed by the project management team</p>		
<p><b>P3</b> Review key stakeholder relationships and their influence on a complex construction project</p> <p><b>P4</b> Assess the importance of stakeholder communications and collaboration to achieve project success</p>	<p><b>M2</b> Evaluate stakeholder decision-making processes in complex construction projects</p>	

Pass	Merit	Distinction
<p><b>L03</b> Specify the attributes and competencies of a project manager in leading complex construction works</p>		<p><b>D2</b> Present a Project Execution Plan that includes the scope, objectives, human and resource planning, and key priorities for a complex project</p>
<p><b>P5</b> Discuss the role and key responsibilities of a construction project manager</p> <p><b>P6</b> Assess the attributes, competencies and managerial skills of a construction project manager</p>	<p><b>M3</b> Compare the duties and qualities of a project manager for different types of complex construction projects</p>	
<p><b>L04</b> Develop a project strategy plan that defines the key policies, procedures and priorities for a complex construction project</p>		
<p><b>P7</b> Examine the key project management processes and social responsibilities in a complex construction project</p> <p><b>P8</b> Prepare a project strategy plan, noting how sustainability will be managed</p>	<p><b>M4</b> Critically evaluate the adoption of Building Information Modelling in complex construction projects</p>	

## Unit 25: Management for Complex Buildings

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>25 Management for Complex Buildings</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Presentation</b> (20 minutes) <b>Contract Planning Study</b> (1000-1500 words)	

## Unit Learning Outcomes

**LO1** Specify the management strategies that may apply at the commencement of construction projects

**LO2** Review the main functions of construction management and team management in relation to complex buildings

**LO3** Analyse the professional relationships involved in managing, planning and coordinating complex projects

**LO4** Discuss contract planning techniques for complex building projects, utilising systems, technologies and supporting instruments for planning/management.

## Assignment Brief and Guidance

You have been appointed as an apprentice within a large construction contracting firm and are now completing your apprenticeship and wish to progress to a more advanced role within the firm. You are hoping to move into a management role within the company, working to plan and coordinate projects. The Managing Director, to evaluate your readiness to progress to a more advanced role, has asked that you prepare a presentation that will cover a range of different aspects related to management of complex projects.

Your **presentation** should consider:

- *Project commencement* – exploring strategies that may be applied and discuss how project management strategies impact on construction planning. Further, you should analyse how strategies and planning have advanced modern construction techniques.
- *Construction Management Team* – evaluate the main roles within a construction team, demonstrating how parties collaborate in the process of managing a complex project; illustrating the collaborative relationships and functions. Justify a commencement and management strategy for a complex project in relation to the management team roles.
- *Professional relationships* – produce an organisational chart that shows the relationship between parties within a construction management team and analyse how information flows between the parties through tender, pre-contract and budgets. Evaluate the importance of sub-contractors within the construction industry.

Your presentation should be approximately 20-minutes long. You are encouraged to make use of drawings, diagrams, charts, etc. to clearly indicate the features that you are seeking to communicate.

In addition to the presentation you are asked to prepare a **Contract Planning Study** – this will illustrate the contract programme for given project and highlight the costing, budget and profit. You will also need to discuss how health & safety has influenced the construction industry, and how BIM has changed the industry. Based on this, you should demonstrate the relationship between planning and support mechanisms that underpin complex building projects. Finally, by critically evaluating a contract programme and the way that stakeholders contribute to the process at different stages, you will provide an overview of the process and those involved.

**Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Specify the management strategies that may apply at the commencement of construction projects		<b>D1</b> Justify a commencement and management strategy for a complex building, with regard to construction management team roles
<b>P1</b> Explore the strategies that may be applied at the commencement of a construction project	<b>M1</b> Analyse how construction strategies and planning techniques have advanced modern construction management techniques	
<b>P2</b> Discuss how project management techniques and strategies impact on the effectiveness of construction planning		
<b>LO2</b> Review the main functions of construction management and the management team in relation to complex buildings		
<b>P3</b> Evaluate the main roles of the construction team within the management process	<b>M2</b> Illustrate the main roles in construction and how collaborative stakeholders function together as a team	
<b>P4</b> Demonstrate how parties collaborate to support and achieve management planning of complex building projects		

Pass	Merit	Distinction
<p><b>L03</b> Analyse the professional relationships involved in managing, planning and co-ordinating complex projects</p>		<p><b>D2</b> Critically evaluate a contract programme with regard to the way that stakeholders may contribute to the process through different stages</p>
<p><b>P5</b> Produce an organisational chart/programme, mapping the relationships of the parties within the construction management team</p> <p><b>P6</b> Evaluate the importance of sub-contractors within the construction industry</p>	<p><b>M3</b> Analyse how information flows between parties in a project, including the significance of the tendering/bidding process, pre-contract arrangements, and budgets</p>	
<p><b>L04</b> Discuss contract planning techniques for complex building projects, utilising systems, technologies and supporting instruments for planning/management</p>		
<p><b>P7</b> Illustrate the contract programme for a given construction project; highlighting costing, budget, profit</p> <p><b>P8</b> Discuss how health &amp; safety and BIM has changed the construction industry, focusing on complex buildings</p>	<p><b>M4</b> Demonstrate the relationship between planning and the support mechanisms which underpin the development and management of a complex building</p>	

## Unit 26: Advanced Construction Drawing & Detailing

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>26 Advanced Construction Drawing &amp; Detailing</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Construction Information Package(s)</b></li><li>• <b>Presentation</b> (approx. 20-minutes)</li></ul>	

## Unit Learning Outcomes

**LO1** Assemble complex construction information packages to meet diverse project needs

**LO2** Integrate design and construction information data from multiple sources

**LO3** Evaluate the relationship between CAD and BIM data in the production and management of construction information

**LO4** Prepare construction information packages for a given complex building project.

## Assignment Brief and Guidance

You are employed as an Assistant Architectural Technologist, with a large design-build construction firm; specialising in multi-purpose (commercial/residential) developments. The firm has been appointed to a new project for a large, multi-occupancy residential development with a ground floor that will host a series of commercial units; including a restaurant.

The design architect has provided you with general arrangement drawings (plan, section, elevation) and an outline specification. The structural engineer has provided basic structural information (column locations, beam sizes, etc.). The information from these consultants is in both BIM and CAD formats.

As a design-build project, the construction information will be developed and released to the site team in 'phased packages'. The Senior Architectural Technologist has given you responsibility for the developing the first three packages:

- Substructure
  - Plan
  - Details
- Ground floor (commercial units)
  - Plan
  - Standard details
  - Door schedule
- First floor (residential units)
- Plan
  - Standard details
  - Window schedule

For these packages:

- To ensure consistency across the various teams that will be developing information packages, you are asked to create a consistent set of standards for the project and the organisation. This will be based on your analysis of how standards drive efficiencies, utilising both BIM and CAD methodologies to ensure accuracy of information.
- Create a set of construction drawings (for the packages required) using the standards defined. Integrate non-graphical data within a BIM system, for the construction project.

To ensure that the site teams understand the development of these packages, you are asked to present, using the construction information packages as visual evidence, and:

- Discuss the importance of defining standards to manage construction information and evaluate the importance of accurate information.
- You are asked to advise on whether the construction information should be developed in CAD software or following a BIM methodology. Assess the ways in which construction information can be developed digitally and traditionally and analyse the difference between CAD and BIM in the creation of construction information. Evaluate the potential advantages of using BIM to develop construction information and discuss way in which BIM systems can ensure accurate drawings and details.
- Discuss how drawing packages are organised within a BIM environment and analyse how construction information packages can be accurately developed in line with client requirements.
- Review the ways that BIM can be used to create and maintain accurate information throughout the project process. Critically evaluate the use of BIM to support accurate construction information.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Assemble complex construction information packages to meet diverse project needs		<b>D1</b> Create a consistent set of standards for both a complex construction project and an organisation, recognising ways to retain consistency and clarity within the information shared and created to avoid error and duplication
<b>P1</b> Discuss the importance of defining standards to create and manage construction drawings	<b>M1</b> Analyse how a consistent set of standards can drive greater efficiencies throughout a project	
<b>P2</b> Evaluate the importance of consistent and accurate information in regard to creating construction drawings for a complex project	<b>M2</b> Utilise both BIM and CAD methodology to ensure construction information packages are correct and clear for a complex project	
<b>LO2</b> Integrate design and construction information data from multiple sources		
<b>P3</b> Assess ways in which construction information can be created in both a traditional and a digitally integrated fashion	<b>M3</b> Analyse the difference between CAD and BIM systems in the creation of design and construction information for a given project	

Pass	Merit	Distinction
<p><b>LO3</b> Evaluate the relationship between CAD and BIM data in the production and management of construction information</p>		<p><b>D2</b> Critically evaluate ways in which BIM data can support more accurate information on a complex project</p>
<p><b>P4</b> Evaluate the advantages of using a BIM-based system to create complex construction information</p> <p><b>P5</b> Discuss ways in which BIM authoring tools can consistently create accurate drawings and details for a complex project</p>	<p><b>M4</b> Review the ways in which BIM data can be accurately created and maintained throughout all stages of a complex project</p>	
<p><b>LO4</b> Prepare construction information packages for a given complex building project</p>		
<p><b>P6</b> Create a set of construction documents for a complex building project using defined standards</p> <p><b>P7</b> Demonstrate how information created in a non-graphical way can be utilised within a BIM authoring platform</p> <p><b>P8</b> Discuss how drawing packages can be organised within the context of a BIM authoring platform</p>	<p><b>M5</b> Analyse how construction information packages can be created accurately in line with detailed requirements outlined by a given client for a complex construction project</p>	

## Unit 27: Construction Technology for Complex Building Projects

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>27 Construction Technology for Complex Building Projects</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• Construction Technology <b>Report</b> (3500-500 words)</li> <li>• <b>Presentation</b> (approx. 20-minutes)</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>L01</b> Evaluate strategies, processes and construction technology for the substructure and superstructure requirements of complex buildings</p> <p><b>L02</b> Justify materials, technology and processes used to construct substructures and superstructures for complex buildings, against time, cost and quality</p> <p><b>L03</b> Select substructures, superstructures, building services systems and internal partition walling, flooring and ceilings to provide flexibility of conditioned spaces</p> <p><b>L04</b> Propose solutions that meet the requirements of safe demolition and disposal of materials and components with regard to buildability, performance and Health &amp; Safety.</p>	



## Assignment Brief and Guidance

You are employed as an Assistant Project Manager for a mid-sized construction contractor. The company has been contracted (under a design-build contract) for a new commercial development. The site requires demolition of a series of small industrial buildings. The Lead Project Manager has asked you to prepare a **Construction Technology Report** for the project. This will include:

- For the given project, propose materials and construction methods to be used and justify these decisions by comparing different approaches to material and construction to determine their suitability.
- Prepare an outline design for the proposed project, including documentation (drawing, specifications), with regard to safe demolition and specify the demolition systems.
- Select substructures, superstructures, building services, partitioning, flooring and ceilings for the proposed projects, comparing different types of these components. As the building may change use, in the future, examine suitable systems to enable alternative uses.

Based on the research and preparation of the above, you are also asked to **present** the proposal to the client and main contractor. This will require:

- Discussing construction technology issues for the given project, and evaluate strategies that address these issues; assessing how technical strategies mitigate issues. As part of this, you should compare alternative strategies.
- Justify the selection of materials and construction methods by critically evaluating the selection of materials, technology and processes; for this project, against time, cost and quality.
- Discuss how the use of BIM facilitates the selection of suitable materials and processes and the benefits of using BIM in production of construction information.
- With regard to the selected materials and technologies, justify the need for reuse, reclamation or recycling to achieve greater sustainability in the project.

## Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Evaluate strategies, processes and construction technology for the substructure and superstructure requirements of complex buildings		<b>D1</b> Compare alternative construction technology strategies for a given complex building
<b>P1</b> Discuss construction technology issues from given complex building projects  <b>P2</b> Evaluate construction strategies that address technical issues	<b>M1</b> Assess how technical strategies can mitigate issues in construction	
<b>L02</b> Justify materials, technology and processes used to construct substructures and superstructures for complex buildings, against time, cost and quality		<b>D2</b> Critically evaluate against time, cost and quality, the materials, technology and processes required to construct a given complex building
<b>P3</b> Propose materials and construction methods for a given complex building project  <b>P4</b> Justify selection of materials and construction methods decisions as they impact on cost, time and quality.	<b>M2</b> Compare different approaches to material and construction method to determine their suitability for a given building project	

Pass	Merit	Distinction
<p><b>LO3</b> Select substructures, superstructures, building services systems and internal partition walling, flooring and ceilings to provide flexibility of conditioned spaces</p>		<p><b>D3</b> Justify the need for reuse, reclamation or recycling at demolition to achieve greater sustainability in a building construction strategy</p>
<p><b>P5</b> Compare different types of building components in selecting for use in providing flexibility of conditioned space</p> <p><b>P6</b> Examine suitable systems to enable alternative building uses</p>	<p><b>M3</b> Discuss how the use of Building Information Modelling facilitates the selection of suitable construction materials and systems</p>	
<p><b>LO4</b> Propose solutions that meet the requirements of safe demolition and disposal of materials and components with regard to buildability, performance and Health &amp; Safety</p>		
<p><b>P7</b> Specify demolition systems to meet the buildability requirements of a proposed building.</p> <p><b>P8</b> Prepare an outline design for an assigned building type with regard to safe demolition.</p> <p><b>P9</b> Prepare documentation (drawings, specifications) for a proposed design solution, recognising safe demolition.</p>	<p><b>M4</b> Discuss the benefits of Building Information Modelling in the production of construction information for complex buildings.</p>	

## Unit 29: Geotechnics & Soil Mechanics

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>29 Geotechnics &amp; Soil Mechanics</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Road Bridge Project</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• <b>Design Proposal</b> (including drawings, details, specifications, calculations, etc.)</li> <li>• <b>Report</b> (3500-5000 words)</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>L01</b> Review rock types, their formation and uses within civil engineering</p> <p><b>L02</b> Explore and classify soils to current codes of practice</p> <p><b>L03</b> Analyse soil properties determined by geotechnical procedures</p> <p><b>L04</b> Produce a proposal to address identified geotechnical weaknesses and problems.</p>	

## Assignment Brief and Guidance

You are employed, by a local civil engineering consultancy, as a Civil Engineering Technician. The consultancy specialises in infrastructure projects; particularly road works, road bridges and underpasses, and has been successful in tendering for the engineering works for a new road bridge.

Initial surveys and core sampling have shown that the proposed location of the new bridge has a complex geotechnical and soil configuration. To address this, the Lead Civil Engineer has asked you to prepare a **Design Proposal** and **Report**.

The **Design Proposal** will:

- Will address the geotechnical issues related to the embankments, bridge and road foundations; based on the survey and testing data supplied. The survey and testing data will be integrated into the proposal.
- This will include:
  - Drawings
  - Details
  - Specifications
  - Calculations, as needed

Your **Report** will need to:

- Discuss rock types, formation and classification; including weather and weather resistance properties, and analyse the discontinuous nature of rock mass. Evaluate the use of rock and uncemented sediments.
- Explore the methods and techniques used in ground and site investigation, soil sampling, soil descriptions and soil classifications; reflecting current codes of practice. In addition, explore how soils are classified, using current codes of practice. Evaluate methods and techniques used in ground and site investigations and soil sampling for the proposed road bridge project; assessing their importance for infrastructure projects.
- Evaluate how soil properties are determined, analysing the results of the soil sampling for the current road bridge proposal.
- With regard to the Design Proposal:
  - Justify the approach in meeting the identified geotechnical issues of the site.
  - Critically analyse the problems caused by discontinuous rock mass for the works required by the proposed road bridge project and use the proposal to illustrate how these are addressed.

## Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Evaluate rock types, their formation and uses within civil engineering		<b>D1</b> Critically analyse example that address problems caused by the discontinuous nature of rock mass when tunnelling and constructing bridges, using case studies as examples
<b>P1</b> Discuss rock type formation and classification, susceptibility to weathering and the weathering processes  <b>P2</b> Analyse the discontinuous nature of rock mass	<b>M1</b> Evaluate the use of rock and uncemented sediments within civil engineering	
<b>LO2</b> Explore and classify soils to current codes of practice		<b>D2</b> Assess the importance of site investigation, soil sampling and determination of soil properties for infrastructure projects
<b>P3</b> Explore methods and techniques used in ground and site investigation, soil sampling, soil descriptions and soil classifications to current codes of practice  <b>P4</b> Explore how soils are classified from soil particle size, soil types, specific gravity and plasticity indices to current codes of practice	<b>M2</b> Evaluate methods and techniques used in ground and site investigation and soil sampling	
<b>LO3</b> Analyse soil properties determined by geotechnical procedures		<b>D3</b> Integrate test data to inform the development of design proposals
<b>P5</b> Evaluate how soil properties are determined, including moisture content, density, specific gravity, shear strength compressibility, liquid and plasticity indices, California bearing ratio	<b>M3</b> Analyse results from soil properties testing	
<b>LO4</b> Produce a proposal to address identified geotechnical weaknesses and problems		
<b>P6</b> Produce design proposals to address geotechnical problems related to embankments, bridge and road foundations for a given site	<b>M4</b> Justify the approach to a design proposal in meeting identified geotechnical weaknesses	

## Unit 30: Advanced Structural Design

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>30 Advanced Structural Design</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Ardent Music Festival</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<p>The submission is comprised of:</p> <ul style="list-style-type: none"> <li>• <b>Structural Report</b> (2000-2500 words) for: <ul style="list-style-type: none"> <li>○ The main stage</li> <li>○ Tensile structures</li> </ul> </li> </ul> <p>The above should include research, calculations, drawings, details and specifications as required.</p>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Explore deflection due to wind loadings, on fixed structures, and strategies to resist wind loading</p> <p><b>LO2</b> Determine bending, shear and deflection for complex support conditions</p> <p><b>LO3</b> Design complex columns and piled foundations based on calculation</p> <p><b>LO4</b> Explore the design of tensile structures.</p>	



## Assignment Brief and Guidance

You are working for a structural engineering and design firm that specialises in the design and installation of large-scale temporary structure for events. The firm has been commissioned to design a large outdoor stage for the Ardent Music Festival. The Ardent Music Festival takes place in Lincolnshire over a two-week period, with a range of different music genres represented during the festival.

The main stage is to be a combination of large, solid features (such as large LED panel screens and PA towers) and space frame construction. As the site of the Ardent Festival is a large, windswept, open field, the effect of wind loading on the main stage is a concern. As the festival runs for an extended period, the design of the stage (while temporary) must ensure extended safety and security against wind-loading, weathering, vibration, live and dead loading.

In addition to the main stage design, the festival organisers have asked your firm to design a series of small-scale tensile structures. This is to be a standard design that can be used for a range of different purposes; such as to house food and drink concessions, merchandise sales, first aid facilities, etc.).

As a structural design technician, you are responsible for the initial design and detailing of the main stage and the design of the tensile structure. The lead structural engineer has requested that you prepare a **structural report** for the main stage and tensile structure. The report should:

- Calculate the wind loads on the main stage elements and discuss methods for resisting and managing wind loading; through analysis of the relationship between form and wind loading. Calculate the size and type of lateral stiffening that will be required for the main stage elements.
- Calculate bending and shear in the different structural elements of the main stage and determine the deflection. Evaluate structural connections and discuss the relationship between bending, shear and deflection. To advise the design team, critically evaluate different materials and their effectiveness in dealing with bending, shear and deflection.
- Calculate the axial load capacity of the vertical column elements of the stage, particularly where eccentric loading may be present. Calculate the axial load capacity of the reinforced concrete foundations that will be required to support the stage in the field, and prepare the design information (drawings, details, etc) for the foundations and columns; discussing the benefit of using BIM in the design process. Assess the most effective foundation types, in relation to speed of construction, cost, safety and environment.
- Discuss the differences between different types of tensile structures that may be used in the festival. To justify the choice of type and design of the tensile structure solution you will need to undertake calculations and compare the different solutions and provide drawings, details and specifications.

**Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Explore deflection due to wind loadings, on fixed structures, and strategies to resist wind loading		<b>D1</b> Calculate and size the type of lateral stiffening required to resist wind loading for a given structure
<b>P1</b> Calculate wind loads on fixed structures <b>P2</b> Discuss methods to resist or manage wind loading	<b>M1</b> Analyse the relationship between building form and wind loading	
<b>LO2</b> Determine bending, shear and deflection for complex support conditions		<b>D2</b> Critically evaluate different materials and their structural efficiency in managing bending, shear and deflection
<b>P3</b> Calculate bending and shear in complex support conditions <b>P4</b> Determine deflection in complex support conditions <b>P5</b> Evaluate structural connections in relation to complex support conditions	<b>M2</b> Discuss the relationship between bending, shear and deflection	
<b>LO3</b> Design complex columns and piled foundations based on calculation		
<b>P6</b> Calculate the axial load carrying capacity of complex columns, with eccentric loading <b>P7</b> Calculate the axial load carrying capacity of reinforced concrete piled foundations <b>P8</b> Prepare design information for a structure utilising piled foundations and steel columns	<b>M3</b> Discuss the benefits of using Building Information Modelling in the design workflow	<b>D3</b> Assess the most effective foundation type for a given scenario in terms of ease and speed of construction, economics, safety and environmental factors

Pass	Merit	Distinction
<b>LO4</b> Explore the design of tensile structures		<b>D4</b> Using calculations as well as other research, justify the choice of a tensile structure solution for a given scenario
<p><b>P9</b> Discuss the differences between types of tensile structures</p> <p><b>P10</b> Design a simple tensile structure for a given scenario</p>	<b>M4</b> Compare tensile structural solutions to a given scenario	

## Unit 31: Advanced Heating, Ventilation & Air Conditioning Design & Installation

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Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>31 Advanced Heating, Ventilation &amp; Air Conditioning Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Sustainable Shopping</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• <b>Presentation</b> (20-minutes)</li> <li>• <b>Design Report</b> (2000-2500 words)</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Compare the different HVAC systems and technologies that serve large commercial or complex/multi-zone buildings</p> <p><b>LO2</b> Evaluate the design requirements for large commercial or complex/multi-zone buildings when selecting heating, ventilation or air conditioning</p> <p><b>LO3</b> Assess how sustainable design strategies can be integrated into large-scale and complex HVAC systems</p> <p><b>LO4</b> Present a proposal for an advanced HVAC system for a complex/multi-zone building.</p>	

## Assignment Brief and Guidance

You have been employed by a local Mechanical Engineering firm, specialising in commercial projects. The firm is working with a range of other consultants on the design and installation planning for a new shopping centre. This complex, multi-zone, environment will require suitable heating, ventilation and air-conditioning system to provide comfort for staff and visitors.

The Lead Mechanical Engineer has asked you to prepare a **presentation**, for the client and consultants, of a proposal for the HVAC system. Your presentation will be accompanied by a **Design Report**; which will be distributed to the client and consultants at the presentation.

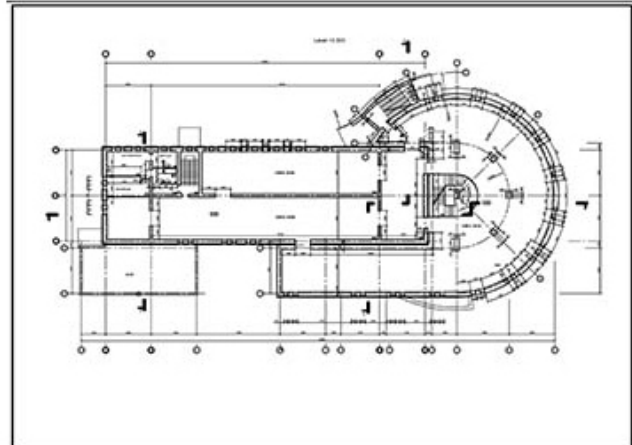
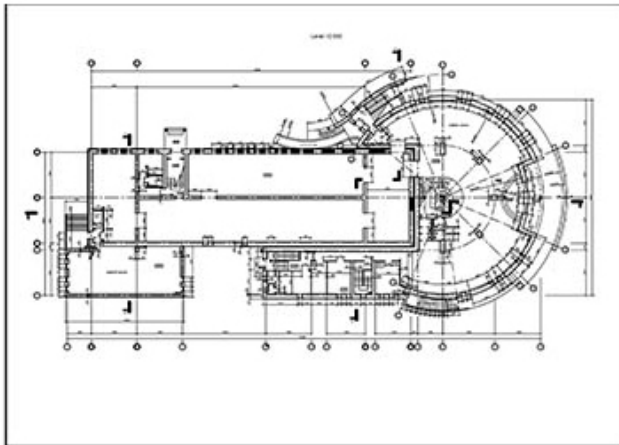
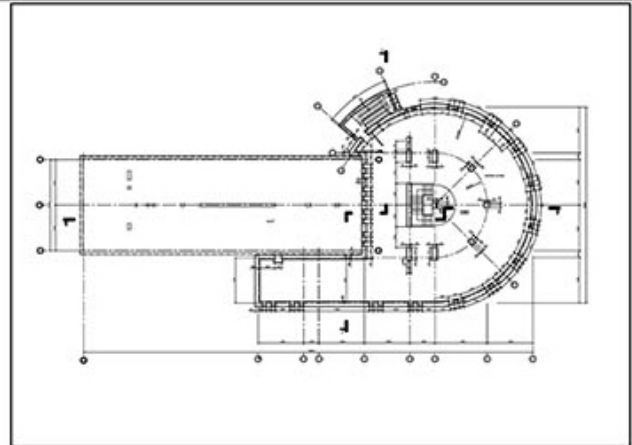
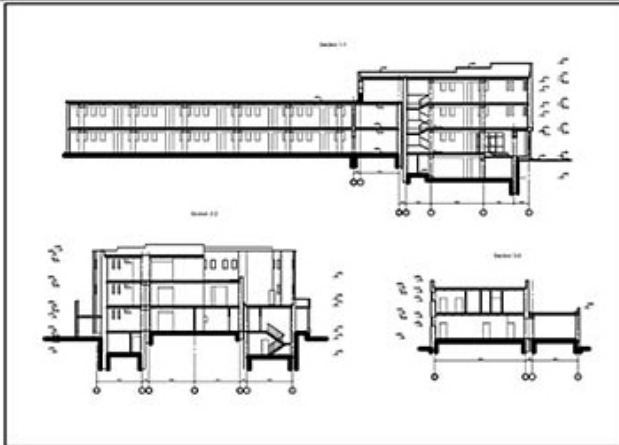
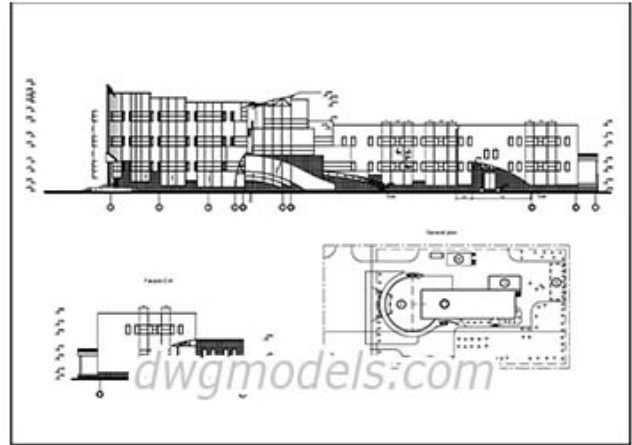
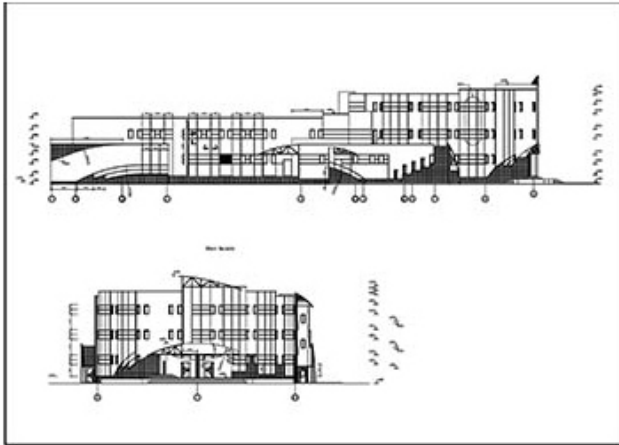
As the client is new to commercial development, your presentation should discuss the common types of HVAC systems used in commercial buildings and the common plan items and distribution methods for these HVAC systems. To assist them in understanding how the HVAC system will support the project, you will need to illustrate the operation of the of shopping centre; critically evaluating how the system and plant choices will impact on construction and performance.

Ensuring that the overall project meets legislative and statutory requirements will mean that all systems are also compliant. To this end, you will need to discuss the current legislation and codes of practice that may have an impact on the design and selection of an HVAC system. Based on this, you should present an evaluation of the key design principles that are required in the selection of a system and analyse the relationship between design and legislation for the project. Given the project type, critically evaluating the key design and legislative criteria will allow you to show how these differ with other types of commercial projects.

Sustainability is a key concern of the client and they aim to use the sustainability of the project as a key marketing feature for the shopping centre; with a number of the main tenants being retail brands at the forefront of sustainable fashion and products. To support this aim, you are asked to discuss the economic and legislative drivers for sustainability in HVAC systems and assess the main considerations for selection of an HVAC system. Through demonstrating how sustainable strategies will inform the operation of the system will allow you to critically analyse the impact of making sustainable technologies a key feature of the selected HVAC system.

Given the key features above, you are asked to prepare a Design Report that will include drawings, details, specifications and calculations. Based on your investigations of the design considerations and system components required, assess the key calculations required to select appropriate plant and propose a system for the project. You will need to include the necessary elements for the work package (drawings, specs, details) for the correctly sized plan and distribution for the shopping centre. In addition, you will show the suitability of the proposed system by evaluating its efficiency for this type of project, and critically evaluating the overall design of the proposed system.

## Instructions and guidance to candidates



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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Compare the different HVAC systems and technologies that serve large commercial or complex/multi-zone buildings</p>		<p><b>D1</b> Critically evaluate different advanced HVAC systems and plant choices and how such choices may impact on the building's construction and performance</p>
<p><b>P1</b> Discuss the common HVAC systems for commercial buildings</p> <p><b>P2</b> Review common plant items and distribution methods for advanced HVAC systems</p>	<p><b>M1</b> Illustrate the operation of a given large or complex building type</p>	
<p><b>LO2</b> Evaluate the design requirements for large commercial or complex/multi-zone buildings when selecting heating, ventilation or air conditioning</p>		<p><b>D2</b> Critically evaluate and select the key design and legislative criteria that are required for advanced HVAC engineering design within differing types of buildings and their intended uses</p>
<p><b>P3</b> Discuss the current legislation and codes of practice that influence the design and selection of advanced HVAC systems</p> <p><b>P4</b> Present an evaluation of the key design principles and fundamentals that are required to select advanced HVAC schemes for buildings</p>	<p><b>M2</b> Analyse the critical relationship between the design fundamentals and legislative requirements that are needed for an effective advanced HVAC design within large and complex buildings</p>	
<p><b>LO3</b> Assess how sustainable design strategies can be integrated into large-scale and complex HVAC systems</p>		<p><b>D3</b> Critically analyse the impact of incorporating sustainable technologies into a HVAC system</p>
<p><b>P5</b> Discuss the economic and legislative drivers for sustainable design in advanced HVAC systems</p> <p><b>P6</b> Assess the main sustainable design considerations for advanced HVAC systems</p>	<p><b>M3</b> Demonstrate how sustainable strategies inform the operation and efficiency characteristics of a HVAC system</p>	



Pass	Merit	Distinction
<p><b>LO4</b> Present a proposal for an advanced HVAC system for a complex/multi-zone building</p>		
<p><b>P7</b> Investigate the design considerations and system components that inform the design process for advanced HVAC services</p>	<p><b>M4</b> Evaluate the efficiency of a HVAC system proposed for a given building type</p>	
<p><b>P8</b> Assess the key design calculations and plant selections that are needed to propose a system design</p>		
<p><b>P9</b> Produce a design package of work, correctly sized plant and distribution for an advanced HVAC system for a given building type</p>		<p><b>D4</b> Critically evaluate design proposals for HVAC systems to confirm suitability for a given building type</p>

## Unit 32: Building Management Systems

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>32 Building Management Systems</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>BMS Design &amp; Development</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Presentation</b> (25 minutes)</li><li>• <b>BMS Design Proposal</b> (1500-2000 words, including calculations, specifications and manufacturers' information)</li></ul>	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Evaluate emerging Building Management System technologies	
<b>LO2</b> Assess how a Building Management System can optimise cost and energy usage	
<b>LO3</b> Discuss the differences between Building Management Systems for domestic and non-domestic buildings	
<b>LO4</b> Specify a Building Management System suitable for a large domestic installation.	

## Assignment Brief and Guidance

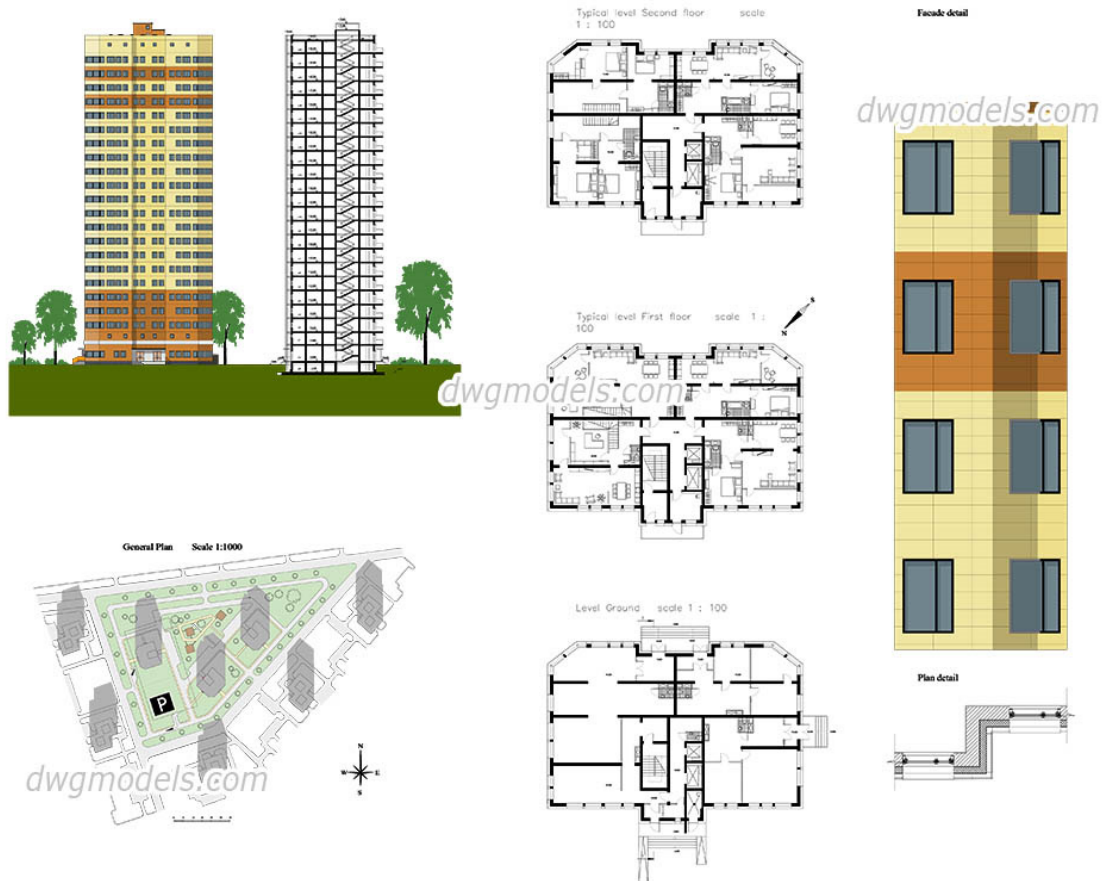
You are employed, as an Assistant Systems Analyst, with Primary Systems Ltd.; a company specialising in the design and installation of building management systems for residential and commercial buildings. The company director would like to start having you lead on the design and specification of systems, but needs to confirm that you are suitably prepared to take on this responsibility. He has asked you to undertake a body of work that will demonstrate your knowledge and skill in building management systems design, operation and analysis.

You are asked to prepare and deliver a **presentation** that will:

- Discuss the principles of building management systems and explain the different approaches to systems integration. Through a comparison of different technologies used in building management systems, for a given project, you may justify the use of a BMS to provide greater user control.
- For two given projects (one with a BMS and one without), you will record energy costs and energy usage. Based on the data gathered, you are to select BMS system to optimise cost and energy usage and justify this system in its ability to achieve greater control through monitoring. Analysing the variations in energy cost and usage, between the two projects.
- Compare a BMS for a domestic and non-domestic installation (in relation to cost, functionality, monitoring and design philosophy) through research into the functions, components, and software and evaluate how the systems would differ.

You are also asked to prepare a **BMS design proposal** for the apartment building project (drawings provided). This will include costings for the installation. In order to determine an effective strategy, you will need to provide information about your analysis of different strategies with reference to cost and manufacturers' data. Using your analysis, you will justify the selection of the BMS system and installation strategy based on cost and improved building efficiency and performance.

## Instructions and guidance to candidates



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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Evaluate emerging Building Management System technologies		<b>D1</b> Justify the use of BMS system in support of greater user control
<b>P1</b> Discuss the principles of Building Management System  <b>P2</b> Explain the different approaches to system integration	<b>M1</b> Compare BMS technologies for a given application	
<b>L02</b> Assess how a Building Management System can optimise cost and energy usage		<b>D2</b> Justify recommendations for a BMS based on a cost, improved building efficiency and improved performance
<b>P3</b> Record, on a data sheet, energy costs and usage for a given set of buildings  <b>P4</b> Select a Building Management System to optimise cost and energy usage  <b>P5</b> Justify the selection of a Building Management System in achieving greater sustainability through control and monitoring	<b>M2</b> Analyse variations in energy costs and usage data between two given buildings; one which incorporates a Building Management System and one that does not	
<b>L03</b> Discuss the differences between Building Management Systems for domestic and non-domestic buildings		
<b>P6</b> Research functions, components, software and systems suitable for a large domestic installation  <b>P7</b> Evaluate how a non-domestic Building Management System would differ from a domestic	<b>M3</b> Compare a BMS for a domestic installation and a non-domestic installation; in terms of cost, functionality, monitoring and design philosophy	

Pass	Merit	Distinction
<b>LO4</b> Specify a Building Management System suitable for a large domestic installation		
<p><b>P8</b> Prepare a design proposal for a large domestic Building Management System installation</p> <p><b>P9</b> Prepare costings for a large domestic Building Management System installation proposal</p>	<p><b>M4</b> Analyse different strategies for a large domestic Building Management System installation with reference to cost analysis and manufacturers' data</p>	

## Unit 33: Advanced Electrical Design & Installation

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>33 Advanced Electrical Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Regional Concert Hall &amp; Cafe</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>System Design Proposal</b> (1000-1500 words)</li><li>• <b>Health &amp; Safety Report Presentation</b> (15 minutes).</li></ul>	

## Unit Learning Outcomes

**LO1** Evaluate the principles that underpin the design and installation of power and distribution systems, electromagnetic compatibility equipment and electrical equipment

**LO2** Discuss the range of protective measures necessary for the safe installation and operation of electrical systems

**LO3** Design an electrical distribution plan for a complex non-domestic building

**LO4** Present a report on the national/regional/local standards for technical and Health & Safety regulations that apply to specific building types.

## Assignment Brief and Guidance

You have recently gained employment with Midgard Electrical Limited, an electrical engineering consultancy that specialises in complex non-domestic projects. You are employed as an Electrical Systems Design Technician.

The firm has been appointed to provide electrical system design for the Regional Concert Hall and Café. You have been tasked with the design of the electrical distribution system for the project; including relevant calculations and specification of equipment. In addition, you have been asked to present a report on the health & safety regulation and standards associated with the electrical system for the Concert Hall & Café.

Your **System Design Proposal** will need to explore the design and installation requirements for power supply, distribution, electromagnetic compatibility and equipment. Based on the requirements for the project, you will need to compare different installation strategies in relation to the health & safety requirements. In order to ensure safe installation, you will need to discuss the protective measures required in normal and fault conditions and illustrate the protective measure for the specific system. Generally, you will assess the appropriate protective measures related to the power supply, distribution, electromagnetic compatibility and equipment.

The design of the system will be based on your calculation of electrical loads and cable sizes for the distribution required within the project. This will also require the specification of correctly sized distribution equipment. You will need to justify the design of the system for power distribution and specification of equipment; based on your review of H&S regulations.

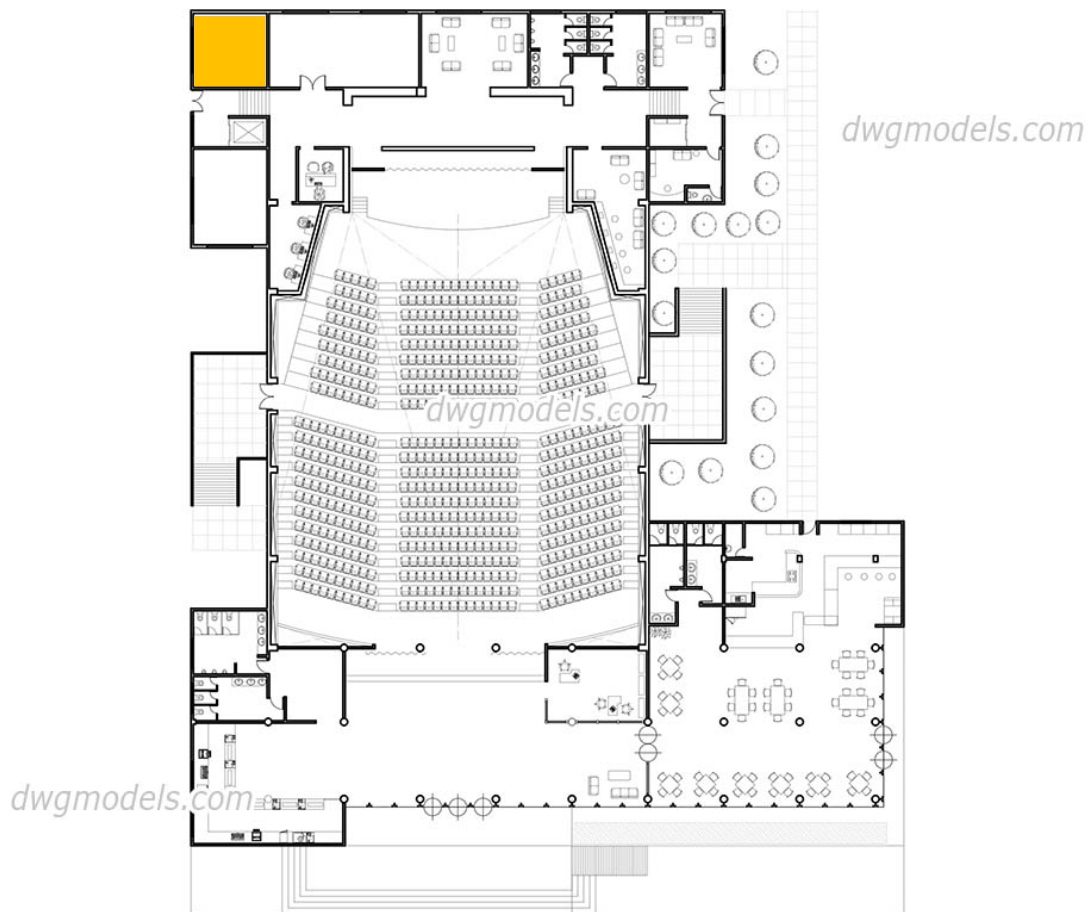
Your **Health & Safety Report** will need to explore the local, regional, national and international regulations associated with the installation of electrical systems and power distribution; evaluating the relationship between different standards at local/regional/national and international levels.

Your **System Design Proposal** should be delivered as a compiled file of work (calculations, specifications, drawings, details, manufacturers' information).

Your **H&S Report** is to be delivered as a PowerPoint presentation to the client and consultants.



## Instructions and guidance to candidates



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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Evaluate the principles that underpin the design and installation of power and distribution systems, electromagnetic compatibility equipment and electrical equipment		<b>D1</b> Assess the appropriate protective measures related to the design of systems for power supply, distribution, electromagnetic compatibility and equipment
<b>P1</b> Explore the principles of design and installation for power supply and distribution, electromagnetic compatibility and electrical equipment	<b>M1</b> Compare the installation strategies of different electrical systems in relation to Health & Safety requirements	
<b>LO2</b> Discuss the range of protective measures necessary for the safe installation and operation of electrical systems		
<b>P2</b> Discuss the range of protective measures in normal and fault conditions	<b>M2</b> Illustrate the protective measures necessary for normal and fault conditions in specific systems	
<b>LO3</b> Design an electrical distribution plan for a complex non-domestic building		<b>D2</b> Justify the design of an electrical power distribution system and the specification of equipment in relation to statutory regulations and Health & Safety
<b>P3</b> Design an electrical distribution plan for a complex non-domestic building	<b>M3</b> Specify correctly sized distribution equipment for an electrical distribution plan	
<b>P4</b> Calculate electrical loads and suitable cabling sizes for an electrical distribution plan		
<b>LO4</b> Present a report on the national/regional/local standards for technical, and Health & Safety regulations that apply to specific building types		
<b>P5</b> Present a report on the range of relevant national/international standards associated with electrical systems and installation	<b>M4</b> Evaluate the relationship between local, regional and national standards related to electrical system design and installation	
<b>P8</b> Discuss the national/regional/local regulations related to electrical power and distribution		

## Unit 34: Advanced Quantities for Complex Building Project

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>34 Advance Quantities for Complex Building Projects</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Office Building</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
Quantities <b>Report</b> (3000-3500 words)	

## Unit Learning Outcomes

**LO1** Apply measurement techniques to a range of complex situations

**LO2** Produce measured quantities for a range of elements and components on largescale projects

**LO3** Develop relevant preamble and preliminary items to given situations

**LO4** Create measured bills of quantities and schedules using both manual and computer techniques.

## Assignment Brief and Guidance

You are employed as an Assistant Quantity Surveyor, with a national consultancy. You have been assigned to the team that is working on a medium-sized office building. The project is planned for a traditional procurement using a Standard Contract with Quantities (e.g. JCT Standard Building Contract with Quantities 2016).

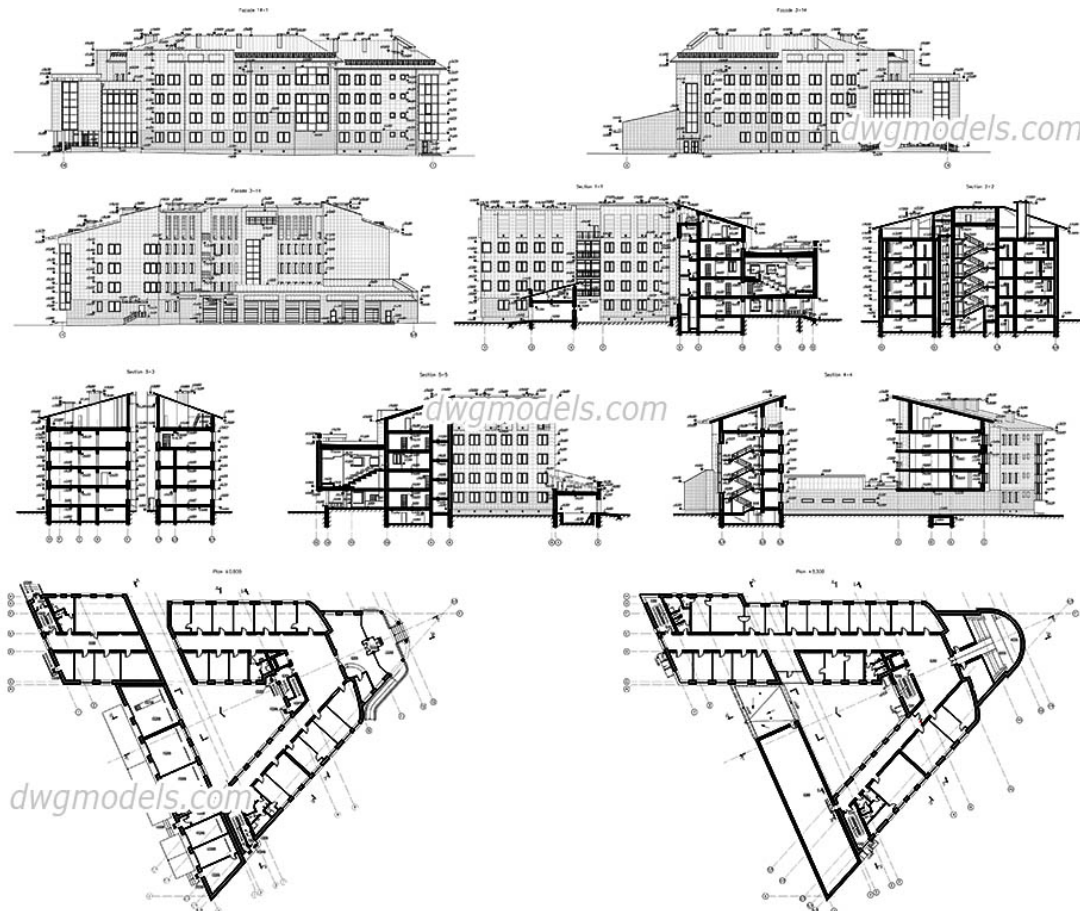
The head of the Quantity Surveying team is considering whether to have you take a more central role in the project, but needs some further confirmation of your ability to take on the additional responsibility. Therefore, he has asked that you carry out a series of preliminary tasks related to the project; in order that he can understand your knowledge, skill and application of the necessary principles.

You have been asked to produce a report that will illustrate your knowledge and understanding. Your report is to include:

- A schedule for a selected element within the project and produce sub-contract package for the element. Differentiate between a sub-contract and supply package.
- Take-off quantities for a substructure element and a superstructure element. In both cases, these should be complex elements; so that you are required to undertake complex take-off processes. Further, with either the superstructure or substructure element, take-off quantities using a digital methodology. Based on your take-off of quantities, critically evaluate manual vs digital methodologies.
- Using the standard contract, prepare the preamble and preliminary clauses for the office building project. Based on this, you will justify the inclusion of the prelim clauses for the project and critically analyse the preamble clauses in relation to stakeholder needs for the project.
- For a selected work section, you are asked to produce a bill of quantities using manual techniques and digital techniques; comparing the accuracy of these different methods. Further, you are to explore the role of BIM in developing a bill of quantities and justify the use of digital or manual techniques for take-off in preparing a bill of quantities.

Your report should be presented with all calculations, drawings, diagrams, specifications, etc. necessary. Bills of quantities should use a standard format and contract clauses should be suitable for the contract types appropriate to the scale of project and the local region.

## Instructions and guidance to candidates



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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Apply measurement techniques to a range of complex situations		<b>D1</b> Critically evaluate manual vs digital taking-off techniques
<b>P1</b> Produce a schedule for an element	<b>M1</b> Differentiate between a sub-contract and supply package	
<b>P2</b> Produce a sub-contract package		
<b>LO2</b> Produce measured quantities for a range of elements and components on large-scale projects		
<b>P3</b> Take-off quantities for a complex substructure element	<b>M2</b> Take-off quantities using digital methodology	
<b>P4</b> Take-off quantities for a complex superstructure element		
<b>LO3</b> Develop relevant preamble and preliminary items to given situations		<b>D2</b> Critically analyse preamble clauses against stakeholder needs for a project
<b>P5</b> Prepare preamble clauses for a given brief	<b>M3</b> Justify the inclusion of preliminary clauses for a project	
<b>P6</b> Prepare preliminary clauses for a complex project		
<b>LO4</b> Create measured bills of quantities and schedules using both manual and computer techniques		<b>D3</b> Justify the use of digital or manual taking-off for specific work sections of a bill of quantities
<b>P7</b> Produce a bill of quantities for a work section using manual techniques	<b>M4</b> Compare the accuracy of manual vs digital taking-off techniques	
<b>P8</b> Produce a bill of quantities for a work section using digital techniques		

## Unit 35: Alternative Methods of Construction

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>35 Alternative Methods of Construction</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Promoting Alternatives</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
YouTube video (20-30 minutes).	

## Unit Learning Outcomes

**LO1** Examine how the construction industry impacts on the environment, and how changes in the industry can create broader social and economic benefits

**LO2** Explore alternative construction methods which are fit for purpose in a given context

**LO3** Discuss government policy implications and Health & Safety constraints associated with alternative construction methods

**LO4** Present a design proposal, utilising a selected alternative construction method.

## Assignment Brief and Guidance

You have been employed by a design-build firm that specialises in projects that use alternative methods of construction. The company is young, and has only a small number of projects completed. The management team has decided that to grow their client-base they need to help potential clients understand the opportunities, challenges and benefits of using alternative methods of construction.

You have been asked to prepare a promotional video to provide information about, and the use of, alternative methods of construction. This will include a design proposal and show the use of CAD.

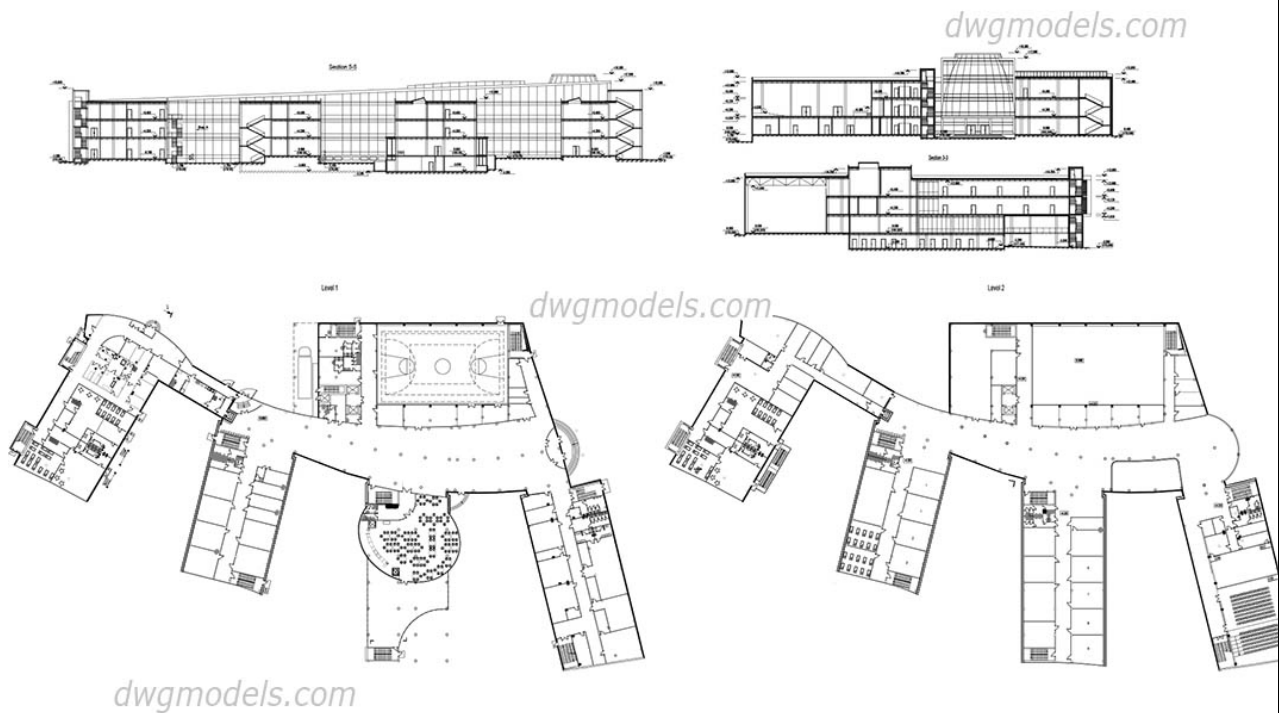
The video will be made available on YouTube. The video that you develop is not intended to be the 'broadcast ready' version; but will provide the management team with an understanding of what you are proposing for the video.

Your video should:

- How the construction industry has an impact on the environment and how social and economic factors influence the industry. In addition, you will assess how government targets and statistics have been effective in improving environmental protection.
- Examine, using historic and contemporary examples, the development of alternative methods of construction and explore different approaches to commercial and domestic projects. Based on this research, you can compare alternative methods of construction in relation to effectiveness, cost and performance and evaluate the impact of an alternative method of construction on environmental protection.
- To help potential clients understand the regulatory frameworks associated with alternative methods of construction, you will examine how government policies have an impact on building design and explore the health & safety considerations related to alternative methods of construction. Reflecting on the constraints that may be imposed by government policies, consider the impact that this may have on alternative methods of construction.
- For a given project, a large primary school, you are asked to produce a design proposal (using CAD) utilising an alternative method of construction. Your presentation, in the video, should show the integration of CAD and how BIM may be an effective means of developing the project information. Finally, based on your design and the research for the video you should justify the use of the chosen alternative method of construction.



## Instructions and guidance to candidates



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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Examine how the construction industry impacts on the environment, and how changes in the industry can create broader social and economic benefits</p>		<p><b>D1</b> Evaluate the impact of specifying an alternative construction method on environmental protection</p>
<p><b>P1</b> Explore how the construction industry has an impact on the built environment</p> <p><b>P2</b> Examine how social and economic factors have an effect on the construction industry</p>	<p><b>M1</b> Assess how effective government targets and national statistics have been on environmental protection</p>	
<p><b>LO2</b> Explore alternative construction methods which are fit for purpose in a given context</p>		
<p><b>P3</b> Examine the development of alternative construction methods using historic precedents</p> <p><b>P4</b> Explore alternative construction methods which can be used for commercial or domestic use</p>	<p><b>M2</b> Compare alternative construction methods in terms of effectiveness, cost and performance</p>	

Pass	Merit	Distinction
<p><b>LO3</b> Discuss government policy implications and Health &amp; Safety constraints associated with alternative construction methods</p>		<p><b>D2</b> Justify the use of a chosen alternative construction method</p>
<p><b>P5</b> Examine how government policies have had an impact on building design</p> <p><b>P6</b> Explore the Health &amp; Safety considerations associated with alternative construction methods</p>	<p><b>M3</b> Illustrate the implications and constraints of government policies on the use of alternative construction methods</p>	
<p><b>LO4</b> Present a design proposal, utilising a selected alternative construction method, and explain how it is 'fit for purpose' in the given context</p>		
<p><b>P7</b> Produce a design proposal, using computer-aided drawing tools, utilising alternative construction methods</p> <p><b>P8</b> Present a design proposal that utilises alternative methods of construction</p>	<p><b>M4</b> Evaluate the effectiveness of using computer-aided drawing software and BIM</p>	

## Unit 36: Advanced Building Information Modelling

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>36 Advanced Building Information Modelling</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>BIM Implementation</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"> <li>• <b>Case Study</b> (1500-2000 words)</li> <li>• <b>Presentation</b> (20-25 minutes)</li> </ul>	
<b>Unit Learning Outcomes</b>	
<p><b>LO1</b> Evaluate the processes and procedures that are required in order to successfully implement BIM within the context of an organisation or a project</p> <p><b>LO2</b> Explore BIM standards and how these support working in the context of a BIM-enabled project</p> <p><b>LO3</b> Discuss key documentation that may be required for a BIM-enabled project</p> <p><b>LO4</b> Assess how BIM can ensure data is created, shared, stored, managed and kept accessible to all stakeholders involved in a project.</p>	

## Assignment Brief and Guidance

You have recently gained employment with an architectural technology firm that specialises in supporting construction companies, architects, and engineers with transitioning to the use of Building Information Modelling.

Your firm is seeking to gain a contract with a large residential property contractor. The contractor has had a very traditional approach to project development, management, construction and delivery; based on the fact that they are a long-established firm. However, they are interested in the potential for BIM to enable their growth and to allow them to better manage their operations.

In order to win the contract, your firm has been asked to prepare a case study and give a presentation that will provide information about the implementation, process and benefits of BIM. Your manager has asked that you prepare the case study and presentation.

The Case Study is intended to provide an example of BIM implementation within an organisation. Based on a selected example, develop the case study to show:

- Evaluation of different BIM implementation methods that may be used in a project and the importance of people, processes and technology in the implementation. In order to illustrate implementation in practice, you should analyse the way in which BIM was implemented in the selected example.
- To show the importance of BIM you will need to critically analyse the way that the BIM implementation assesses the capability of the organisation, in the example; with regard to how effective information delivery can support a project.

Your Presentation is intended to cover the key areas of standards, documents and data management. This will require:

- A discussion of how BIM standards provide consistency for implementation. Evaluating the key BIM standards, used globally, will allow you to review how these impact BIM adoption.
- Discuss the Asset Information Model and how it is managed and used. Evaluating a BIM Execution Plan will allow you to consider the importance of it being clear, concise and its importance to design team members; analysing how it is managed and updated for a project.
- In the context of data creation, management and storage; discuss the term 'Level of Definition' and how it relates to BIM. Assessing the importance of clearly defined roles and role requirements will allow an analysis of the recommended roles and requirements in BIM and how these aid in project development and management.
- Finally, your analysis of the use of key documents and processes will allow you to communicate the ways that these documents ensure information is developed and managed effectively as part of a BIM-enabled project.

You are asked to provide your Case Study after your Presentation is completed, so that it may be reviewed in more detail.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Evaluate the processes and procedures that are required in order to successfully implement BIM within the context of an organisation or a project</p>		<p><b>D1</b> Critically analyse the importance of a BIM implementation plan that assesses the capability of the organisation in regard to BIM and how effective information delivery can support this in the context of a project</p>
<p><b>P1</b> Evaluate the variety of BIM implementation methods that can be undertaken in regard to a project</p> <p><b>P2</b> Evaluate the importance of people, processes and technology in regard to BIM implementation</p>	<p><b>M1</b> Analyse an example of how BIM can be implemented within an organisation</p>	
<p><b>LO2</b> Explore BIM standards and how these support working in the context of a BIM-enabled project</p>		
<p><b>P3</b> Discuss how the use of standards can provide a consistent framework for the implementation of BIM and BIM-enabled systems</p> <p><b>P4</b> Evaluate key BIM standards that are recognised globally</p>	<p><b>M2</b> Review BIM standards and how these are affecting BIM on a global scale</p>	

Pass	Merit	Distinction
<p><b>LO3</b> Discuss key documents that may be required for a BIM-enabled project</p>		<p><b>D2</b> Analyse how the use of key documents and processes enabled by these documents can ensure that information is developed and managed intelligently as part of a BIM-enabled project</p>
<p><b>P5</b> Discuss the Asset Information Model and how it can be managed and utilised</p> <p><b>P6</b> Evaluate the BIM Execution Plan and the importance of ensuring it is clear, concise and easily understood by all members of the design team</p>	<p><b>M3</b> Analyse the importance of a BIM Execution Plan and explain how this document is managed, updated and utilised within a BIM project</p>	
<p><b>LO4</b> Assess how BIM can ensure data is created, shared, stored, managed and kept accessible to all stakeholders surrounding a project</p>		
<p><b>P7</b> Discuss the term 'Level of Definition' in the context of BIM</p> <p><b>P8</b> Assess the importance of defining clear roles and role requirements regarding a BIM project</p>	<p><b>M4</b> Analyse the recommended roles and requirements needed in the context of BIM and how these will ultimately aid the development of a project at all stages</p>	



## Unit 37: Environmental Assessment & Monitoring

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>37 Environmental Assessment &amp; Monitoring</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Building Assessment Video</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Online Video</b> (30-40 minutes).	

## Unit Learning Outcomes

**LO1** Discuss what is meant by sustainability and its relevance to the built environment

**LO2** Compare the ways that sustainability in construction can be quantified, assessed and monitored, and how this can be used to drive change in the construction industry

**LO3** Evaluate the features and drivers behind different environmental assessment methods

**LO4** Carry out an environmental assessment on a building; comparing its performance with similar buildings.

## Assignment Brief and Guidance

You have recently gained employment with a building services consultancy that specialises in sustainable design for buildings and building monitoring. The consultancy is a start-up firm and is still in a growth phase; seeking new clients and promoting their services within the sector. For this reason, they have decided to develop an online video, to promote the importance of sustainability and the value of building monitoring. The video will be used on the company website, but hosted on YouTube; so that it can be shared by email to potential customers.

You have been asked to prepare a 'rough cut' of the video, which should include:

- A discussion of the 'three pillars of sustainability and the impact of mankind on the environment. An analysis of the ways that buildings impact on sustainability and the barriers facing the industry. In addition, by analysing the interrelationship between the 'three pillars' you will be able to critically evaluate how governments use legislation to address sustainability.
- Through a series of comparisons; including qualitative vs. quantitative measures and 'bottom-up' vs. 'top-down' approaches to sustainability, you will examine how different approaches drive the industry to reduce environmental impact and critically evaluate how assessment methods aim to overcome barriers to sustainable construction.
- To highlight the company's work in building assessment and monitoring, you are asked to compare industry-standard environmental assessment methods and highlight their particular strengths. Based on this, you should evaluate different methods for assessing the environmental impact of materials and components and how these are measured in different assessment methods. You will need to analyse the different environmental assessment methods, and their approach to reducing the environmental impact of a building.
- To illustrate the work of the company, you are asked to show an example of an environmental assessment process. This will include your assessment of the environmental performance of a given building, comparing its performance with similar buildings. You are asked to examine how the results of an environmental assessment can provide information on how to improve building performance.
- In closing, you are to critically evaluate how environmental assessments respond to different concerns, in regard to sustainability, and may lead to improvements in the performance of buildings.

Your rough-cut video should include drawings, diagrams, live action, voiceovers, etc. that are necessary to explain the material and to engage the audience. As this is a 'rough-cut', you may use your phone camera or other consumer-grade video camera. However, while the audio/video quality is not, necessarily, expected to be of 'broadcast quality' the quality of the content is expected to be of the highest standard (in regard to accuracy and clarity).

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Discuss what is meant by sustainability and its relevance to the built environment		<b>D1</b> Critically evaluate how governments seek to address sustainability through legislation
<b>P1</b> Discuss the 'three pillars of sustainability' and the impact humankind is having on the environment  <b>P2</b> Analyse the ways in which buildings are unsustainable and the barriers to sustainability in the construction industry	<b>M1</b> Analyse how the 'three pillars of sustainability' are interrelated, and why it is important for the built environment to balance these	
<b>LO2</b> Compare the ways that sustainability in construction can be quantified, assessed and monitored; evaluating how this can be used to drive change in the construction industry		<b>D2</b> Critically evaluate assessment methods and how they aim to overcome the barriers to sustainable construction.
<b>P3</b> Compare quantitative and qualitative measures of sustainability  <b>P4</b> Compare 'bottom-up' and 'top-down' approaches to driving sustainability	<b>M2</b> Examine how different approaches to sustainability drive the construction industry to reduce its environmental impact	

Pass	Merit	Distinction
<b>LO3</b> Evaluate the features and drivers behind different environmental assessment methods		<b>D3</b> Critically evaluate how environmental assessment methods respond to different environmental concerns and improve the performance of the building
<p><b>P5</b> Compare industry standard building-level environmental assessment methods and identify their particular areas of emphasis</p> <p><b>P6</b> Evaluate different methods of evaluating the environmental impact of materials and components, and how these relate to building level schemes</p>	<b>M3</b> Analyse the various environmental assessment methods and their approaches towards reducing a building's impact	
<b>LO4</b> Carry out an environmental assessment on a building; comparing its performance with similar buildings.		
<p><b>P7</b> Assess the environmental performance of a given building using an industry standard environmental assessment method</p> <p><b>P8</b> Compare a given building's environmental performance with other similar buildings</p>	<b>M4</b> Examine how the results of the environmental assessment can be used to improve the environmental performance of the building	

## Unit 38: Personal Professional Development

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>38 Personal Professional Development</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Record of Work Experience</b> (3500-5000 words).	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Assess personal learning needs and opportunities within the context of employment	
<b>LO2</b> Plan and manage own personal learning journey, through consultation with employer and tutor/instructor	
<b>LO3</b> Record personal progress and the feedback of others; responding as appropriate to own future development	
<b>LO4</b> Evaluate own learning, based on personal experience and comments from others, in order to plan for the future.	

## Assignment Brief and Guidance

Congratulations on attaining a placement with X Construction Limited. For the next three-months, you will be engaged in work-based learning through the company. In order to ensure that you are making the most of how this experience will contribute to your overall development, the College and the Company have designed the following Record of Work Experience (RoWE) to support your Personal Professional Development. You are asked to complete the following:

- **Personal Learning Needs & Opportunities Review**

- This section of your RoWE asks you to analyse your prior learning to identify areas for further development. Reviewing the operations of your employer; identify opportunities to address areas for further development. By completing a Skills Audit, you will further identify areas for additional training. Through a discussion of your personal training and development needs; in relation to the opportunities available in your employment, you will need to justify your personal development plans and identify the time and resource requirements (both physical and human).

- **Personal Learning Journey Log**

- This section of your RoWE asks you to develop your personal development plan, including SMART goals to meet personal and employer needs. You will need to present your personal development plan to your employer and you tutor. In preparing for your meeting with employer/tutor you should compare the expectations you have of yourself, your employer and your tutor in order to identify areas for further discussion.
- As you progress through your work-placement, you will manage your own personal development and record this in your Personal Learning Journey Log. In each of your Log entries, you should be reflecting on the success (or challenge) of integrating your own goals with those of the company.

- **End of Placement Review**

- As you complete your work-placement, you will need to assess your own learning and development. This will involve your recording of a process of *360-degree Feedback* with your employer. Based on the 360-degree Feedback, you are asked to prepare a plan for your future development in relation to your new career goals. This will also require you to evaluate, and record, your career goals in relation to how these may be supported by your identification of further development.
- In summarising your work-placement experience, you will need to critically assess your own process of learning and development; highlighting areas of success and areas for further improvement.

All of the above should be submitted upon completion of your work-placement.

### **Instructions and guidance to candidates**

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## Learning outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Assess personal learning needs and opportunities within the context of employment		<b>D1</b> Justify personal development plans in relation to employer needs, identifying resource requirements and time commitments of self and others
<b>P1</b> Analyse prior learning to identify potential areas for development <b>P2</b> Review employer operations in order to identify training/development opportunities <b>P3</b> Undertake a skills audit to define areas of personal development/training needs	<b>M1</b> Discuss personal training/development needs with employer needs/goals	
<b>LO2</b> Plan and manage own personal learning journey, through consultation with employer and tutor/instructor		
<b>P4</b> Develop a personal development plan <b>P5</b> Develop SMART goals to meet personal and employer needs <b>P6</b> Present a personal development plan to an employer and tutor	<b>M2</b> Compare the expectations of self, employer and tutor to establish areas of commonality and divergence	

Pass	Merit	Distinction
<b>L03</b> Record personal progress and the feedback of others; responding as appropriate to own future development		
<p><b>P7</b> Manage own personal development through the course of the work-based learning experience</p> <p><b>P8</b> Periodically review own progress and development</p>	<p><b>M3</b> Reflect on instances of successful convergence of own goals and company goals, and instances of divergent goals</p>	<p><b>D2</b> Critically assess own learning and development, in order to communicate examples of good practice and improvement for the future</p>
<p><b>L04</b> Evaluate own learning, based on personal experience and comments from others, in order to plan for the future</p>		
<p><b>P9</b> Assess own learning and development through reflection and 360-degree feedback</p> <p><b>P10</b> Prepare a plan for future development in relation to career goals</p>	<p><b>M4</b> Evaluate career goals in relation to future learning and professional development needs</p>	

## Unit 39: Transport Systems in Buildings

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>39 Transport Systems in Buildings</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
	<ul style="list-style-type: none"><li>• Transport <b>Feasibility Study</b> (3500-5000 words)</li><li>• <b>Design Proposal</b></li></ul>
<b>Unit Learning Outcomes</b>	
	<p><b>L01</b> Discuss the functional requirements for circulation within a proposed building design</p> <p><b>L02</b> Determine traffic planning and equipment selection criteria</p> <p><b>L03</b> Discuss the installation of escalators and moving walkways into a building</p> <p><b>L04</b> Evaluate the installation of lift systems.</p>

## Assignment Brief and Guidance

You have recently started working for ACME Building Systems, a firm that specialises in the design of transport systems for buildings; including lifts, escalators, and moving walkways. The firm has recently been appointed to prepare a proposal for systems to support the construction of a new terminal for a regional airport.

The terminal is divided into two parts. Concourse 1 will include the ticketing, security and commercial (restaurants, shops, etc.) and is divided onto two floors. The ground floor will house the ticketing and security checkpoints, while the upper floor will host the commercial areas. Approximately 150m away from Concourse 1 will be Concourse 2; which will (on the first floor) house the gates for embarking and disembarking of flights and on the ground floor, will house the baggage claim and exits.

Based on this, there is a need for lifts and escalators in both Concourse 1 and Concourse 2, as well as a moving walkway linking the two (at first floor level).

Your manager has asked that you prepare the Feasibility Study and initial Design Proposal for the project. She specifies that these should include:

- **Transport Feasibility Study:**

- An assessment of stakeholder requirements for movement in the building; comparing these with statutory requirements.
- An explanation of the factors that will inform the selection of transportation system, and an evaluation of the performance criteria in meeting statutory requirements.
- Assessing the factors that affect traffic levels and examination of the criteria for lift selection. Further, a consideration of the traffic requirements in relation to the performance of a selected lift will allow critical evaluation of a lift system design in meeting the requirements of traffic flow.
- Explore the installation of escalators for movement between levels within Concourse 1 and Concourse 2, as well as the installation requirements for moving walkways between the Concourses. Analysis of the installation of moving walkways and escalators; in relation to stakeholder needs.
- The Feasibility Study should include drawings, diagrammes, specifications, calculations, etc. as necessary to support your findings.

- **Design Proposal:**

- In detail, examine the installation of a lift system and provide detail design of the structural elements to support a lift installation. Evaluating the lift installation, in meeting the requirements of building regulations will further allow critical analysis of the system in regard to fire safety and fire-fighting use.  
The Design Proposal should include scaled CAD/BIM information, specifications, calculations, etc. as necessary.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Discuss the functional requirements for circulation within a proposed building design		<b>D1</b> Evaluate the performance criteria of a transport installation in meeting statutory regulations
<b>P1</b> Assess stakeholder requirements for movement within a building <b>P2</b> Explain the factors that affect the selection of a transportation system	<b>M1</b> Compare stakeholders' needs with statutory requirements	
<b>LO2</b> Determine traffic planning and equipment selection criteria		<b>D2</b> Critically evaluate the design of a transportation system in meeting the traffic planning analysis
<b>P3</b> Assess the factors that affect the level of traffic for a transport system <b>P4</b> Examine the criteria that affect the selection of lifting and transportation equipment	<b>M2</b> Contrast traffic requirements against the performance of selected equipment	
<b>LO3</b> Discuss the installation of escalators and moving walkways into a building		<b>D3</b> Critically analyse a vertical transportation system with regard to fire-fighting use
<b>P5</b> Explore the installation of escalator systems <b>P6</b> Discuss the installation of moving walkways	<b>M3</b> Analyse the installation of an escalator or moving walkway system against stakeholders' needs	
<b>LO4</b> Explain the installation of lift systems		
<b>P7</b> Examine the installation of a lift system <b>P8</b> Detail the design of the structural elements in support of a lift installation	<b>M4</b> Evaluate the lift installation in meeting the requirements of the building regulations in terms of fire and fire fighting	

## Unit 40: Alternative Energy Systems Design & Installation

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>40 Alternative Energy Systems Design &amp; Installation</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Energising the Estate</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• <b>Design Report</b> (3000-4000 words)</li><li>• <b>Presentation</b> (25 minutes)</li></ul>	
<b>Unit Learning Outcomes</b>	
<p><b>L01</b> Calculate a load duration curve from given data relating to a supply situation</p> <p><b>L02</b> Evaluate the principles that underpin the design and installation of alternative methods of power generation and distribution</p> <p><b>L03</b> Discuss the social, political, environmental and economic factors related to alternative energy systems</p> <p><b>L04</b> Report on the selection of an alternative energy scheme for a given context.</p>	

## Assignment Brief and Guidance

You are working for a specialist electrical engineering firm that provides services related to alternative energy. The firm has been commissioned by a local housing association who are interested in developing an energy generation system for their housing estate. This will allow them to provide energy for the estate; ideally, using a renewable system and lowering the cost of energy for their residents. They are interested in the potential to supply both electricity and heating for the estate.

Your manager has asked you to undertake research and prepare a proposal for an alternative energy system for the estate. Your proposal is to be offered to the client as a Design Report and a Presentation.

The **Design Report** will provide the data and information to specify the system and the installation strategy. This will require calculation and drawing of typical load and load duration curves from data supplied for the estate. Illustrating the changes in load over time for varying situations will define the parameters for selection of the system and the definition of a strategy for alternative power generation; based on optimal load duration. Based on a comparison of different systems, you will specify an alternative energy generation scheme and illustrate this for the project; highlighting the key factors that have informed the selection.

The **Presentation** is intended to provide a discussion of the ways in which social, political and economic factors influence the discourse of the environment and alternative energy. Through an evaluation of the ways that global warming and carbon emissions impact on the adoption of alternative energies, you will help the client to understand the context in which alternative energy adoption is situated.

In addition, your presentation will analyse the proposed energy generation system to define the installation strategy and discuss the installation requirements. This will include a comparison of different systems for power generation that have led to your selection for the project. In summary, in your presentation, you will justify the selection of the system based on the technical, social political and economic factors that have informed the selection.

### Instructions and guidance to candidates

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.ighernationals.com](http://www.ighernationals.com)



## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Calculate a load duration curve from given data relating to a supply situation		<b>D1</b> Define a strategy for alternative power generation, based on optimal load duration
<b>P1</b> Calculate and draw typical load and load duration curves from given data relating to a supply situation	<b>M1</b> Illustrate changes in load, over time, for varying supply situations	
<b>LO2</b> Evaluate the principles that underpin the design and installation of alternative methods of power generation and distribution		
<b>P2</b> Analyse a given energy generation system in order to define an installation strategy <b>P3</b> Discuss the installation requirements of a given alternative energy generation system	<b>M2</b> Compare different systems of power generation in order to select a suitable system	
<b>LO3</b> Discuss the social, political, environmental and economic factors related to alternative energy systems		<b>D2</b> Justify the selection of an alternative energy system, for a given context, which recognises the social, political and economic factors that influence the selection process
<b>P4</b> Discuss the ways in which social, political and economic factors influence the discourse around the environment and alternative energy	<b>M3</b> Evaluate the ways in which global warming and carbon emissions impact on the adoption of alternative energies	
<b>LO4</b> Report on the selection of an alternative energy scheme for a given context		
<b>P5</b> Specify an alternative energy generation scheme for a given context <b>P6</b> Illustrate an alternative energy scheme for a given context, highlighting the key factors informing the selection	<b>M4</b> Present a comparison of different alternative energy systems in support of the decision for a selected system	

## Unit 41: Surveying for Construction, Renovation & Refurbishment

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>41 Surveying for Construction, Renovation &amp; Refurbishment</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Office Renovation/Refurbishment</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<ul style="list-style-type: none"><li>• Interactive <b>Workshop</b> (Presentation – 20 minutes)</li><li>• <b>Survey Report</b> (3000-4000 words)</li></ul>	

## Unit Learning Outcomes

**LO1** Examine an existing building to determine its character

**LO2** Investigate methods of building construction

**LO3** Assess mechanisms of failure and deterioration in historic buildings

**LO4** Produce a building survey report in support of a proposed conservation, renovation or refurbishment scheme.

## Assignment Brief and Guidance

The building surveying firm that you work for has been commissioned, by a new developer, to advise on the viability and process of refurbishing or renovating an existing commercial building. The building, while not historically significant (it is not 'listed') does have some historical character and the client would like this retained. Built in the early 20<sup>th</sup> century, as a local government building, but was converted to commercial offices in the 1960's.

As the client has not undertaken this type of development work, they have asked that your firm explain the key principles of refurbishing, renovation, conservation as well as your proposals for the project.

Your manager has asked you to host a **Workshop** for the Developer's team. The aim of the workshop is to inform the Developer team about the principles of refurbishment, renovation and conservation. Following the workshop, you will share your **Survey Report** for the existing building and scheme for refurbishment/renovation.

For the Workshop, you will need to prepare an interactive presentation that will discuss different building types and their characteristics, as well as the differences between conservation and restoration in historic buildings. Using the Developer's project, evaluate the development of architectural styles in relation to cultural context and critically analyse the relationship between architectural style, building type and materials. As a part of this, you will explore the construction of the client's building and the methods of construction and the development of methods of construction related to different materials.

To help the client understand why renovation, refurbishment and conservation are necessary, you will need to differentiate between the mechanisms of failure and deterioration in building fabric. Using examples from your survey of the existing building (see below), you should analyse building defects and explain the mechanism of failure. Finally, in order to help the client understand the issues associated with works to historic buildings, you will need to discuss the statutory responsibilities associated with historic works.

Based on your planning, you will undertake a survey of the existing building. Based on your survey data, you will prepare a professional **Survey Report**. This will include your recording of the construction methods and condition of the building, along with a proposal for the renovation or refurbishment. This should be justified in relation to the surveyed defects.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Assess an existing building to determine its character		<b>D1</b> Critically analyse the relationship between architectural style, building type and materials in a given building
<b>P1</b> Discuss different building types and their characteristics <b>P2</b> Discuss the difference between conservation and restoration in historic buildings	<b>M1</b> Evaluate the development of architectural styles in relation to cultural context	
<b>L02</b> Investigate methods of building construction		
<b>P3</b> Explore the methods of construction in given buildings	<b>M2</b> Examine the development of methods of construction and the use of different materials.	
<b>L03</b> Assess mechanisms of failure and deterioration in historic buildings		<b>D2</b> Justify a proposal for conservation/renovation or restoration of a historic building, with reference to surveyed defects
<b>P4</b> Differentiate between mechanisms of failure and deterioration in the fabric of a building <b>P5</b> Analyse building defects and explain the mechanism of their failure	<b>M3</b> Evaluate the condition, defects and determine reasons for failure in a given building	
<b>L04</b> Produce a building survey report in support of a proposed conservation, renovation or refurbishment scheme		
<b>P6</b> Plan and undertake a survey of an historic building <b>P7</b> Produce a professional building survey report of an historic building <b>P8</b> Discuss the statutory responsibilities associated with historic buildings	<b>M4</b> Record the construction methods and condition of an historic building	

## Unit 42: Highway Engineering

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>42 Highway Engineering</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Highway Works</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Highway Engineering Report</b> (3000-3500 words)	
<b>Unit Learning Outcomes</b>	
<b>LO1</b> Evaluate how a new highway route is identified, planned and designed	
<b>LO2</b> Assess the methods of earthwork operations, bridges and tunnelling which are used in connection with the provision of highways	
<b>LO3</b> Justify the selection of pavement construction type for a given highway provision	
<b>LO4</b> Present a report that specifies improvement that can be made to a given highway infrastructure project, including maintenance techniques and planning.	

## Assignment Brief and Guidance

The civil engineering consultancy where you are employed has been appointed to develop a programme of works for an extension to a section of local highway. This is to include a new section of highway that will include tunnelling works. In addition, there is a need to propose maintenance techniques for the new and existing works.

The Lead Civil Engineer has requested that you prepare the **report** for the Highways Commission. This is specified to include:

- An analysis of how the route of the new highway has been identified and planning; highlighting the legal procedures required. This will be based on your review of the schematic design.
- To support the new section of highway, you need to evaluate the anticipated earthworks required and prepare an outline design and method statement for the new tunnel section. As part of this, you are asked to discuss the relationship between earthworks, and other civil engineering constructions (such as bridges and tunnelling). Finally, you need to critically analyse the design details for the earthworks necessary for the new tunnel section of the highway.
- You will need to select the pavement type to be used in the new section of highway, based on your analysis and comparison of different types of rigid and flexible pavement and evaluate the methods that may be used for providing flexible pavement.
- Your report will need to present improvement for the existing highway sections; based on your evaluation of the faults identified. A schedule of maintenance regimes required to maintain the highway will allow you to discuss the techniques that may improve the effectiveness and conditions of the works.
- Finally, your report should critically evaluate your findings and proposals to offer alternatives that may also be appropriate for the condition.

## Instructions and guidance to candidates

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Evaluate how a new highway route is identified, planned and designed		<b>D1</b> Critically analyse design details for the earthwork operations, bridges and tunnelling of a new highway
<b>P1</b> Analyse how the route of a new section of highway is identified and planned; highlighting the required legal procedures	<b>M1</b> Review a schematic design, considering the application of current practice	
<b>L02</b> Assess the methods of earthwork operations, bridges and tunnelling which are used in connection with the provision of highways		
<b>P2</b> Evaluate all the anticipated earthwork operations for a major new highway within a developed sector of a community, including difficult terrain  <b>P3</b> Prepare an outline design and method statement for the forming of a tunnel section on the proposed new highway	<b>M2</b> Discuss the interrelationship between the earthwork operations, bridges and the tunnelling of a new highway	
<b>L03</b> Justify the selection of pavement construction type for a given highway provision		<b>D2</b> Evaluate the methods and techniques for providing a flexible pavement to a new highway
<b>P4</b> Select a pavement type to be used and provide a critical analysis to justify your decision  <b>P5</b> Justify the selection of a pavement construction type	<b>M3</b> Compare flexible and rigid pavement construction for a new highway	



Pass	Merit	Distinction
<p><b>LO4</b> Present a report that specifies improvements that can be made to a given highway infrastructure, including maintenance techniques and planning</p>		
<p><b>P6</b> Present improvements to a given existing and new highway provision</p> <p><b>P7</b> Evaluate common highway faults and highlight effective maintenance regimes as preventative measures for a given project</p>	<p><b>M4</b> Discuss techniques and methods which can improve the effectiveness and conditions of the given highway project</p>	<p><b>D3</b> Critically evaluate a report on improvements to a highway infrastructure scheme, including alternative actions that could be taken</p>

## Unit 44: Advanced Surveying & Measurement

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>44 Advanced Surveying &amp; Measurement</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
	<ul style="list-style-type: none"><li>• <b>Topographic Survey</b> (drawings and data)</li><li>• <b>Setting-out</b> (drawings and data)</li><li>• <b>Report</b> (2000-2500 words)</li></ul>

## Unit Learning Outcomes

**LO1** Conduct a traverse survey on GPS obtained co-ordinates including corrections

**LO2** Produce a full topographic survey; identifying landscape features, heights and positions of existing structures, for a given site

**LO3** Evaluate industry standard techniques in transferring control points up a multi-storey structure

**LO4** Prepare a report on the benefits of software applications and emerging technology used in surveying and Setting-out.

## Assignment Brief and Guidance

You are working as an assistant site surveyor for a large surveying firm. The firm specialises in the production of site surveys and setting out for construction. The firm has been commissioned to undertake a large number of series of topographic surveys for a major client. The client has provided GPS data and your manager has asked that you carry out a survey and report on the accuracy of the data and the process.

You are asked to conduct a closed traverse survey, using the GPS data; using differential correction to adjust survey data as needed. Based on this you will prepare a short report that discussed the use of GPS technology in establishing station points and the potential error sources in GPS data. You will need to define a control point network in order to complete the topographic survey and produce the requisite drawings (using industry standard notation). Following this, your report will evaluate the accuracy of GPS data in relation to traditional methods of surveying and assess the potential for instrument error in defining complex control point network. From this, you may critically analyse the accuracy achieved in a station network, utilising GPS data.

With the topographic survey complete, the client has asked that your firm to set-out the project. You are asked to extract and transfer the required data from a given project to a total station, so that setting out can commence. Using total station free station programme, you are asked to complete the setting out; with horizontal and vertical control.

Based on the surveying process and setting out, you are asked to expand your report to include a consideration of the accuracy and potential benefits of technological systems for surveying and setting-out. Discuss the digital tools available for use in surveying and setting-out, and assess the benefits of digital tools in surveying and setting-out. Based on this, you are asked to recommend the selection of appropriate digital tools for the survey that you have completed. You are to analyse the accuracy achieved from the setting-out operation; including tie distances, total station stored data and any other means. Finally, you are asked to critically evaluate the potential errors that can occur in transferring control points.

**Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Conduct a traverse survey on GPS obtained coordinates including corrections		<b>D1</b> Critically analyse the accuracy achieved in a station network using GPS data and total station networks for a topographic survey
<b>P1</b> Conduct a closed traverse survey using GPS data  <b>P2</b> Discuss the use of GPS technology in establishing station points and the potential error sources in GPS data  <b>P3</b> Use differential correction techniques to adjust GPS survey data, as necessary	<b>M1</b> Evaluate the accuracy of GPS survey data in relation to traditional methods of surveying	
<b>LO2</b> Produce a full topographic survey, identifying landscape features, heights and positions of existing structures, for a given site.		
<b>P4</b> Define a control network to complete a full topographic survey  <b>P5</b> Produce survey drawings; with contours, features and structures shown using industry standard notation	<b>M2</b> Asses the potential for instrument error in defining a complex control network	

Pass	Merit	Distinction
<p><b>L03</b> Evaluate industry standard techniques in transferring control points up a multi-storey structure</p>		<p><b>D2</b> Critically evaluate the potential errors that may arise in transferring control points</p>
<p><b>P6</b> Extract and transfer the required data from a given project to a total station in order to allow Setting-out to commence</p> <p><b>P7</b> Complete a full setting-out operation on a given project by utilising a total station free station programme; including both horizontal and vertical control</p>	<p><b>M3</b> Analyse the accuracy achieved from a setting-out operation from tie distances recorded, total station stored data and other means</p>	
<p><b>L04</b> Prepare a report on the benefits of software applications and emerging technology used in surveying and setting-out</p>		
<p><b>P8</b> Discuss digital tools available for use in surveying and setting-out</p> <p><b>P8</b> Assess the benefits of digital tools in surveying and setting-out</p>	<p><b>M4</b> Select appropriate digital tools to use for a given survey requirement</p>	

## Unit 45: Maintenance & Operations

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>45 Maintenance &amp; Operations</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Maintenance Case Study</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Case Study</b> (3000-3500 words, PDF)	
<b>Unit Learning Outcomes</b>	
<p><b>L01</b> Discuss the different industry sectors involved in maintenance, specific material elements and materials used in the maintenance of buildings</p> <p><b>L02</b> Compare the different types of maintenance management available and how they interrelate</p> <p><b>L03</b> Demonstrate how Building Information Modelling assists in managing maintenance and operations effectively and efficiently</p> <p><b>L04</b> Assess how maintenance and operations are managed as part of a wider business management strategy.</p>	

## Assignment Brief and Guidance

You have recently gained employment with a large facilities management firm. A major feature of the firm's work is centred around the maintenance and operational management of building assets for clients, this has focused mainly on the provision of maintenance staff for large educational clients. The company has embarked on a restructure and rebranding, with the aim of shifting their focus on the management aspects of maintenance and operations. As a part of this, they are building up a body of case studies; to be included on their new website.

As a new member of the team, you have been asked to research and prepare a case study. This will cover aspects of the industry, generally, types of services (in the maintenance and operations field, building information modelling (which the company is implementing across its managed assets) and maintenance and operations as part of business strategy.

You are asked to prepare a case study; referring to a specific project where appropriate. The case study should include drawings, photographs, charts, etc. in order to make clear the points that are raised.

Your case study should discuss the different industry sectors involved in maintenance and operations and how these contribute directly or indirectly in building and infrastructure projects. This should include a consideration of the different material elements that are used in building maintenance and assess the primary factors that inform health & safety, sustainability and environmental protection in building maintenance operations. You will need to evaluate the relationship between operating costs and maintenance for projects.

As your company is shifting their focus toward management, you will need to discuss the different management approaches associated with building/infrastructure maintenance and illustrate how this can involve different management approaches. By comparing different approaches, you will evaluate the advantages and disadvantages of the different approaches; and critically analyse how maintenance can be undertaken and managed, over time, to ensure compliance with statutory regulations and legislation.

Building Information Modelling is a growing area of activity for the company, but not all potential clients recognise the importance of this. Your case study should review the financial considerations that are sought to be addressed through building maintenance and operations, and discuss the role of BIM in managing and mitigating building maintenance issues through the building lifecycle. You will want to explore the benefits and constraints involved in using BIM for planning maintenance and operations programmes.

With their shift to a more management-level range of services, the firm needs to help potential clients recognise the value of maintenance and operations management for their business. Discuss the impact of facilities management and maintenance on each other; in terms of day-to-day operations. Assess those areas of building maintenance that are managed as part of the normal operational management and how these address statutory legislation and compliance. Reflecting upon the contract parameters for facilities management will allow you to explain the implications that maintenance and operations may have on core business practices. Finally, you will need to critically evaluate the role of BIM in supporting sustainable practices in maintenance and operations and how this can contribute to broader business strategies and practices.



The case study is intended to be downloaded by the potential clients, so its appearance will be important. You should aim to ensure that the visual character of the case study is of the highest standard. This should include a cover (ideally with a good image of the project that you will refer to within) and consistent use of font styles, sizes, etc.

### **Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p><b>LO1</b> Discuss the different industry sectors involved in maintenance, specific material elements and materials used in the maintenance of buildings</p>		<p><b>D1</b> Critically analyse how maintenance may be undertaken over a period of time whilst ensuring compliance with statutory regulations and legislation</p>
<p><b>P1</b> Discuss the different sectors in industry that contribute directly and indirectly to the maintenance of buildings and infrastructure</p> <p><b>P2</b> Discuss the different material elements that are commonly used in building maintenance</p> <p><b>P3</b> Assess the primary factors that need to be considered in relation to Health &amp; Safety, sustainability and the environment when undertaking general building maintenance works</p>	<p><b>M1</b> Evaluate the relationship between building maintenance and building operating costs</p>	
<p><b>LO2</b> Compare the different types of maintenance management available and how they interrelate</p>		
<p><b>P4</b> Discuss management approaches to undertaking maintenance</p> <p><b>P5</b> Illustrate how maintenance of a building or infrastructure can be undertaken through the interrelation of more than one maintenance management type</p>	<p><b>M2</b> Evaluate the advantages and disadvantages of each of the maintenance management approaches</p>	

Pass	Merit	Distinction
<p><b>LO3</b> Demonstrate how Building Information Modelling assists in managing maintenance and operations effectively and efficiently</p>		<p><b>D2</b> Critically evaluate the role of Building Information Modelling in supporting sustainable practice in maintenance and operations, relating this to broader business practices and strategies</p>
<p><b>P6</b> Review the financial considerations that are required to be addressed when developing maintenance and operations programmes</p> <p><b>P7</b> Discuss the role of Building Information Modelling in managing built assets throughout their lifecycle</p>	<p><b>M3</b> Explore the benefits and constraints of using a model for planning maintenance and operations programmes</p>	
<p><b>LO4</b> Assess how maintenance and operations are managed as part of a wider business management strategy</p>		
<p><b>P8</b> Discuss the impacts of core business and facilities/maintenance management on one another, on a day-to-day basis</p> <p><b>P9</b> Assess the areas of maintenance that are managed as part of an operational management structure and acknowledge the statutory legislation that requires formal compliance</p>	<p><b>M4</b> Reflect on the contract parameters for facilities management and explain the implications on core business, in relation to maintenance and operational management requirements</p>	

## Unit 46: Nutritional Diseases and Disorders

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### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>46 Advanced Materials</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Material Report</b> (3000-3500 words)	

## Unit Learning Outcomes

**LO1** Evaluate the characteristic properties which contribute to the mechanical functionality of materials

**LO2** Examine failure mechanisms of different materials through intrinsic and extrinsic methods

**LO3** Present a case study exploring innovative and smart materials and their role in sustainable construction

**LO4** Analyse material selection and design strategies in either a structural or civil engineering environment.

## Assignment Brief and Guidance

You are seeking employment, as an assistant material analyst, with Testing division of the BRE. As one of the final candidates, you have been asked to present a body of research that shows your knowledge and skill for working in this role. You will be giving a presentation to cover a number of different areas.

You are asked to produce a Material Report, this will:

- Discuss the ways materials are characterised, using a range of examples. Show how you may determine the properties and characteristics of materials based on test data. In addition, you will need to evaluate how material characteristics may change based on the form in which the material is commonly available, and described the effects that manufacturing processes may have on material properties. Based on this, you should evaluate data from material characterisations and discuss how this will inform material selection.

For a given structural element, you should explore the effect of intrinsic and extrinsic modes of failure. For the structural element, select the material and processing methods that may be commonly used, and discuss remedial or preventative action to enhance the service life of the materials and the element.

To show you knowledge of new materials, you will evaluate key performance features of 'smart' materials and present a case study of the different types of innovative materials available in construction; describing the typical applications, their characteristics and properties. For the given structural element, previously used, analyse how a smart or innovative material could be an alternative.

A new road bridge is being constructed, and you are to analyse a selection of materials for the road surface (and sub-surface), in order to select a suitable material for this application. You will justify the selection, articulating the benefits that this material offers, and assess the use of this material in terms of structural performance and sustainability.

All of the above will be included in your Material Report, including all drawings, diagrammes, calculations, etc. The Material Report is to be submitted as an A4 PDF document. Please ensure that a full bibliography is included and that all quotes, references, etc. are fully cited in an appropriate manner.

**Instructions and guidance to candidates**

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Evaluate the characteristic properties which contribute to the mechanical functionality of materials		<b>D1</b> Evaluate data from material characterisation techniques and discuss how this information may inform material selection choices
<p><b>P1</b> Discuss material characterisation methods for a selection of vocationally relevant materials</p> <p><b>P2</b> Determine the properties and characteristics of materials based on data from testing</p> <p><b>P3</b> Evaluate how material characteristics are influenced by the forms in which materials are commonly available</p>	<p><b>M1</b> Describe the effects of different manufacturing methods in relation to material properties</p>	
<b>LO2</b> Examine failure mechanisms of different materials through intrinsic and extrinsic methods		
<p><b>P4</b> Explore cause and effect of intrinsic and extrinsic modes of failure</p> <p><b>P5</b> Select materials and processing methods for a given structural element</p>	<p><b>M2</b> Discuss methods of remedial or preventative action to enhance service life of a range of materials</p>	
<b>LO3</b> Present a case study exploring innovative and smart materials and their role in sustainable construction		<b>D2</b> Using a given structural element or characteristic of traditional manufacture, analyse how a smart or innovative material could replace it
<p><b>P6</b> Evaluate key performance features of smart materials</p> <p><b>P7</b> Produce a case study discussing the use of innovative materials currently available or in use in the construction industry</p>	<p><b>M3</b> Describe typical applications of smart materials with reference to their characteristics and properties</p>	

Pass	Merit	Distinction
<b>LO4</b> Analyse material selection and design strategies in either a structural or civil engineering environment		
<b>P8</b> Analyse a selection of suitable materials for a given design problem or structural element	<b>M4</b> Justify the selection of construction materials by exploring the benefits gained from specific production processes or techniques for their intended end use	



## Unit 47: Construction Data Management

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>47 Construction Data Management</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Data Capture and Management</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Presentation</b> (20 minutes) <b>Data Management Strategy</b> (1000-1500 words)	

## Unit Learning Outcomes

**LO1** Assess the importance of information management within the construction industry

**LO2** Evaluate the role of information management and how it can benefit and support intelligent information exchanges

**LO3** Illustrate the information delivery cycle, in regard to BIM, and how the information management process aids the design, construction and occupation of an asset

**LO4** Discuss the ways in which information can be captured, shared and managed throughout a project lifecycle.

## Assignment Brief and Guidance

You have recently gained employment with an architectural technology consultancy. The consultancy have been supporting construction and architecture firms to implement BIM processes within their companies. As this part of the business has expanded, they have found that many clients do not have good processes for data management. Thus, the consultancy is planning to begin offering additional services in supporting clients to develop good practice in construction data management.

You have been asked, by the managing director of the consultancy, to develop a presentation for potential clients. This is to include a PowerPoint presentation and notes that can be provided to a client either at their premises or when they visit your offices. To review the presentation deck, the managing director has asked that you present to a group from within the consultancy who will role-play as a client team.

The presentation will need to:

- Discuss the importance of information management and assess how information should be managed across a project; with particular emphasis on how this relates to BIM. By reviewing information management techniques, you should explore how this may positively affect a building or infrastructure project; and, you will be able to evaluate the tools to manage data assets.
- Evaluating the role of information management; including the key requirements of the role in projects and how it supports collaborative working. Along with this, you will want to review the responsibilities associated with an 'information manager' for a project and how their responsibilities are different from 'traditional' project roles.
- Based on the above, you should also be able to critically evaluate the way that different formats, deliverables and processes benefit a range of stakeholders through increased accuracy and efficiency of data.

In order to help potential clients understand the use of data, you will develop a Data Management Strategy.

- The strategy should discuss how the information delivery cycle aids a project (throughout the different stages) and illustrate how information is shared and managed through the delivery cycle. This will require a review of how information is transferred during the design and construction stages and into the asset management phase.
- In order to have a coherent data management strategy it is necessary to have clear processes for capturing appropriate data. Assess ways in which information can be captured from different sources, including BIM authoring tools and discuss the information deliverables that will be relevant to an asset. To help clients understand the importance of data accuracy, you should analyse ways that information can be collated and verified on behalf of an asset owner, to ensure that information and deliverables are suitably captured by suppliers.
- Finally, in order to provide potential clients with an understanding of the service that your consultancy can offer, you will evaluate the differences between existing forms of Common Data Environments (CDE) and develop, on behalf of an asset owner, an implementation plan.

The **presentation** should be developed in PowerPoint (or similar presentation software) and should include drawings, diagrammes, audio, etc. as necessary to explain the points you are making. The presentation should be no longer than 20 minutes.

The **Data Management Strategy** will be distributed to the audience, on the date of the presentation, for their review and evaluation after.

### **Instructions and guidance to candidates**

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

\*Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global [www.highernationals.com](http://www.highernationals.com)

## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>LO1</b> Assess the importance of information management within the construction industry		<b>D1</b> Critically evaluate the way that information exchange formats, deliverables and processes benefit stakeholders by increasing the accuracy of information
<b>P1</b> Assess how information should be intelligently managed across a project  <b>P2</b> Discuss the importance of information management and how it relates to the BIM process	<b>M1</b> Review information management techniques that can positively affect a building or infrastructure project  <b>M2</b> Evaluate the tools available to effectively manage information across an asset portfolio	
<b>LO2</b> Evaluate the role of information management and how it can benefit and support intelligent information exchanges		
<b>P3</b> Evaluate the role of information management and the key requirements of this role in regard to a building project  <b>P4</b> Evaluate how information management is supported by the key concepts relating to collaborative working	<b>M3</b> Review the responsibilities of an assigned 'information manager' for a project and how these responsibilities differ from the roles that are traditionally appointed on a project	

Pass	Merit	Distinction
<p><b>LO3</b> Illustrate the information delivery cycle in, regard to BIM, and how the information management process aids the design, construction and occupation of an asset</p>		<p><b>D2</b> Evaluate the differences between the current forms of a Common Data Environment (CDE) and create an implementation plan on behalf of an owner</p>
<p><b>P5</b> Discuss how the information delivery cycle can aid and support a project across all stages</p>	<p><b>M3</b> Review how information will be transferred across a project during the design and construction stage and into the asset management stage</p>	
<p><b>P6</b> Illustrate how information is shared and managed in line with an information delivery cycle</p>		
<p><b>LO4</b> Discuss the ways in which information can be captured, shared and managed throughout a project lifecycle</p>		
<p><b>P7</b> Assess ways in which information can be captured from a variety of sources, including BIM authoring tools</p> <p><b>P8</b> Discuss the information deliverables that may be relevant to an asset</p>	<p><b>M4</b> Analyse ways in which information can be collated and 'checked' on behalf of an asset owner to ensure asset information and information deliverables have been captured by suppliers</p>	

## Unit 48: Scientific Principles for Building Services

**Please note that this Example Assessment Brief is NOT an authorised assignment brief. It is provided as a reference only.**

Centres must develop assignments and assessment materials that meet the needs of their students and align with their curriculum planning. This Example Assessment Brief may be used as a starting point for the development of an assignment; however, Centres are expected to modify and revise the Example Assessment Brief to meet the specific needs of their students and curriculum. All assessment briefs must be Internally Verified.

### Example Assessment Brief

Student Name/ ID Number	
<b>Unit Number and Title</b>	<b>48 Scientific Principles for Building Services</b>
Academic Year	
Unit Tutor	
<b>Assignment Title</b>	<b>Becoming Team Leader</b>
<b>Issue Date</b>	
Submission Date	
IV Name & Date	
<b>Submission Format</b>	
<b>Building Services Science Report (2000-2500 words)</b>	

## Unit Learning Outcomes

**LO1** Calculate energy transfer rates in different building services contexts

**LO2** Evaluate conditions of fluid flow to determine energy loss

**LO3** Design electrical circuits for single-phase AC networks

**LO4** Determine the effects of sound and vibration related to building services and human comfort.

## Assignment Brief and Guidance

Your employer, a large building services firm, are considering giving you additional responsibility to lead a small team on projects. However, before making you a team leader they need to confirm that you have the necessary knowledge and skill required to oversee a team that will be undertaking project critical analysis and calculation. Therefore, your manager asks that you undertake, and present the results of, a series of calculations related to building services. You will need to present both your process (working-out) as well as the results in a **Building Services Science Report**. You are asked to:

- Determine the heat transfer through a series of different composite structures. For these, you will also determine the risk of interstitial condensation.
- For a give set of building services plan/equipment calculate the conduction rates.
- Based on your calculations above, you will take viewers through an evaluation of the impact of heat transfer on thermal comfort and efficiency of building services equipment. Further, taking a range of heat emitters, plant and equipment, you will critically evaluate the efficiency of heat transfer in these items.
- In consideration of energy loss, you will discuss the types of fluid flow, fluid energy and mechanisms of energy loss. To illustrate this, you will calculate the energy loss in pipe and duct networks and analyse the relationship, under different gravitational flow conditions, of frictional energy loss. Then, for design and control of building services, you will critically evaluate the application fluid flow and energy principles.
- In support of electrical services, discuss the difference between resonant and non-resonant circuits, based on design examples of each; for a single-phase AC network, and calculate the current flow. Through this, you will compare the effects of resistance, capacitance and induction; in parallel and series circuits, on voltage, resistance and impedance. Based on these calculations, you will analyse methods to improve the power factor of a given circuit.
- Finally, to illustrate matters related to acoustics, you are asked to explain the principles of sound and vibration on room acoustics and their impact on human hearing. Further, you are asked to determine the typical transmission paths of sound; from building services plant and equipment, through different building structures. Based on this, you will assess the potential for reduction of sound transmission through the use of insulation and attenuation; proven by calculation. Then, you are asked to evaluate the relative efficiency of different ant-vibration mounting systems; for building services equipment/plant, to reduce the acoustic sound levels.

The **report** should include drawings, diagrammes, photographs, and worked-through calculations; as necessary to explain and illustrate the above.

### **Instructions and guidance to candidates**

**Note:** All information sources and resources, including websites used to complete this assignment must be stated and correctly referenced in the document and/or presentation. No credit will be given for wholesale copying from information sources and checks for plagiarism may be made on your submitted work.

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## Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<b>L01</b> Calculate energy transfer rates in different building services contexts		<b>D1</b> Critically evaluate the efficiency of different forms of heat transfer for a given range of heat emitters, plant and equipment
<b>P1</b> Determine heat transfer through different forms of composite structure <b>P2</b> Determine the risk of interstitial condensation in multi-leaf plane structures <b>P3</b> Calculate conduction rates used in various building services plant and equipment	<b>M1</b> Evaluate the impact of heat transfer on thermal comfort and efficiency of building services plant and equipment	
<b>L02</b> Evaluate conditions of fluid flow to determine energy loss		
<b>P4</b> Discuss the types of fluid flow, fluid energy and the potential mechanisms of energy loss <b>P5</b> Calculate the energy loss in pipe and duct networks, using appropriate formulae	<b>M2</b> Analyse the relationship between frictional energy loss under different gravitational flow conditions	<b>D2</b> Critically evaluate fluid flow and energy principles in relation to their application in the design and control of building services engineering
<b>L03</b> Design electrical circuits for single-phase AC networks		<b>D3</b> Analyse the methods to improve the power factor of a given circuit
<b>P6</b> Discuss the difference between resonant and non-resonant circuits <b>P7</b> Design resonant and non-resonant circuits, for single-phase AC networks; calculating current flow	<b>M3</b> Compare the effect of varying resistance, capacitance and inductance in parallel and series AC circuits on voltage, resistance and impedance	

Pass	Merit	Distinction
<p><b>LO4</b> Determine the effects of sound and vibration related to building services and human comfort.</p>		<p><b>D4</b> Evaluate different forms of anti-vibration mounting to minimise building services acoustic sound power levels</p>
<p><b>P8</b> Explain the principles of sound and vibration on room acoustics and their impact on human hearing</p> <p><b>P9</b> Determine the transmission paths of sound, from building services systems, through different forms of structure</p>	<p><b>M4</b> Assess the potential reduction of sound transmission through insulation and attenuation strategies, based on comparison of results of appropriate calculations</p>	

**August 2020**

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