



PEARSON BTEC

**LEVEL 4
HNC**

**DIPLOMA IN
CONSTRUCTION & THE
BUILT ENVIRONMENT
(CIVIL ENGINEERING)**

**COURSE HANDBOOK
2018-19**

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1. Introduction

1.1 Welcome to the Sheffield College

Congratulations on choosing higher education at the Sheffield College. We hope that the time you spend with us will be both enjoyable and rewarding and that you will be able to take full advantage of all that the College and the City of Sheffield have to offer.

Starting a new course can be a confusing and worrying time. As a group of students you come with a wide range of experiences. Some of you are living away from home for the first time; others have lived or worked in Sheffield for a considerable period. Some of you have come from school or college, others are returning to study after several years working outside the education system. You come in all shapes and sizes, age ranges, ethnicity and gender, from the UK, The European Union and other countries. What you all have in common is that you are about to begin study for the first time at higher level. We hope that you will quickly make friends within the group and that the group as a whole binds together so that you all support each other. In many ways you are each other's most important resource.

We hope you will find that the course you have chosen fulfils all your expectations and that by the time you leave us you will be fully equipped to meet the demands of employment and your chosen career path.

Steve Tipping

Head of HE and Access

1.2 The College

The Sheffield College has around 20,000 students in total, 600 of which are on university level courses. Higher Education at the Sheffield College operates across 2 campuses; City and Hillsborough. Higher Education is based within departments in order to give you access to specialist facilities. Each course has a designated HE Curriculum Leader, who is responsible for the day to day running of your course, and is your first point of contact.

We are proud of our vocational facilities, which are among the best in the north of England, and our staff work hard to ensure you get a valuable experience when using them. You will find your tutors and support staff approachable and available to help you every step of your journey. For us, your time here is 'all about you' and we hope that you will work with us to continue to build a vibrant HE community.

1.2 Purpose of this handbook and how to use it

An important aspect of offering high quality courses of study in higher education is the provision of information for students which is accurate, comprehensive and reliable for your learning needs.

In support of this objective, this handbook is designed to meet the expectations of the QAA Code of Practice for the Assurance of Academic Quality and Standards in Higher Education.

The handbook provides information about your course team, the course you have chosen to study, assessment, personal academic and pastoral support, learning resources, quality assurance, work-based learning and opportunities for further study. It is a document that you will need to dip into during the course, when you need to look up, for example, what to do if you are ill. It contains the rules by which we all must live; so keep it in a safe place for future reference.

2. Course Team

2.1 Contacting Staff

At the Sheffield College we are proud of the amount of tutor support we provide. We encourage you to contact tutors if you need any help or support with your work, or if you have any queries about their unit. Whilst you can often catch staff in their workrooms during breaks, email is usually the best method of contact at other times, as tutors have busy teaching commitments and may not be readily available by phone. If you do contact by phone, be prepared to leave a message with your phone number; your tutor will always phone you back to arrange a time to meet with you to discuss any concerns you may have.

As well as having tutors for different units of the course, each course has an HE Curriculum Leader, who is responsible for the day to day running of the course. You should contact the HE Curriculum Leader if you have any queries concerning the course and how it operates, or if you are unable to attend class for any reason, for example due to illness.

In addition, groups of courses are managed by a Director. You are unlikely to need to make contact with the Director, unless your HE Curriculum Leader is absent from College for any length of time. Contact details for individual tutors will be given to you in class, by the tutors themselves. Contact details for your HE Curriculum Leader and Director are listed below.

Course	Curriculum Leader	Director
Construction and the Built Environment (Civil Engineering) - Pearson BTEC Level 4 HNC	Stuart Clark stuart.clark@sheffcol.ac.uk 0114 260 2004 City W116	Victoria Taylor Victoria.taylor@sheffcol.ac.uk 0114 260 2181

2.2 The Sheffield College University Centre

The College has a dedicated specialist University Centre to service HE students. This is your first point of contact for all administrative queries. The administrator, Sue Fletcher can be contacted on 0114 260 2597 susan.fletcher@sheffcol.ac.uk Sue will either be able to answer your query herself, or give you the contact details of the appropriate person to help you. Carol Sheldon, carol.sheldon@sheffcol.ac.uk and Julia Mills, julia.mills@sheffcol.ac.uk are part time HE Administrators. The Head of HE and Access, Steve Tipping can be contacted on 0114 260 2587 stephen.tipping@sheffcol.ac.uk

3. The Course

3.1 Programme Specification

This is the Programme Specification for your proposed course. It gives you information about how you will be taught, assessed, and supported whilst at college.

What Award Will I Get?

Pearson BTEC Level 4 HNC Diploma in Construction and the Built Environment (Civil Engineering).

Is It Approved By Any Professional Body?

Pearson BTEC Higher Nationals are designed to provide a specialist vocational programme, linked to professional body requirements and National Occupational Standards where appropriate.

The qualifications provide a thorough grounding in the key concepts and practical skills required in their sector and their national recognition by employers allows direct progression to employment.

Aims of the Programme

This qualification is designed to equip individuals with the knowledge, skills and experience to be able to gain employment in the construction industries or to progress onto undergraduate degrees.

Learning Outcomes of the Programme

You will develop your knowledge and understanding of a wide range of construction subjects through lectures, seminars and directed study.

Your communication and study skills will be developed through a planned tutorial programme and a wide variety of assignment tasks including presentations, essay and report writing. Your analytical skills will be developed through practical sessions and project work.

Knowledge and Understanding

By the end of the programme you will have knowledge of and be able to understand:

- locate, extract, read and use appropriate literature drawn from multiple sources with a full and critical understanding
- design, plan, conduct and report investigations and research to solve problems and communicate the results of their study accurately and reliably
- seek solutions to routine and unfamiliar problems through the analysis and synthesis of a range of concepts, knowledge and skills to formulate evidence-based arguments and evaluate and summarise information critically
- analyse and interpret data and present quantitative and qualitative information, together with analysis, argument and commentary, in a form appropriate to the intended audience; using appropriate quantitative techniques, relevant IT software and media
- relate academic knowledge, skills and understanding to skills in the workplace and where appropriate, demonstrate their integration through workplace experience and activities
- think independently and apply complex theories to practical realistic work situations, some requiring innovation and creativity
- apply their subject-related and transferable skills in contexts where the scope of the task and the criteria for decisions are generally well defined but where some personal responsibility and initiative are required

- recognise the moral and ethical issues of construction, sustainability, the environment, and scientific enquiry and experimentation
- appreciate the need for ethical standards and professional codes of conduct and apply insight and judgement in relation to the margins and consequences of error
- develop an understanding of the interdisciplinary nature of construction, and of the skills required to work in non-adversarial integrated teams with other professions in construction
- take responsibility to manage and direct their own and where appropriate, the activities of others
- identify and address their own learning needs within defined contexts, recognise their own learning style and undertake further guided learning in new areas

Intellectual Skills

By the end of the programme you will be able to:

- analyse, synthesise and summarise information critically
- read and use appropriate literature with a full and critical understanding
- think independently, solve problems and devise innovative solutions
- design, plan, conduct and report on investigations
- use your knowledge, understanding and skills to evaluate and formulate evidence-based arguments critically and identify solutions to clearly defined problems of a general routine nature
- communicate the results of your study and other work accurately and reliably using a range of specialist techniques
- Carry out independent enquiry and critical analysis by undertaking a sustained research investigation of direct relevance to your area of specialist knowledge or interest.

Practical Skills

By the end of the programme you will be able to:

- take responsibility for their own learning and recognise their own learning style
- apply subject knowledge and understanding to address familiar and unfamiliar problems
- identify and address their own major learning needs within defined contexts and to undertake guided further learning in new areas

How will I be taught?

The HNC L4 is taught part/time over 2 years.

	Learning Methods
Knowledge and Understanding	<ul style="list-style-type: none"> • Lectures and seminars • Directed study of textbooks and journal articles • Assignment work • Project work
Intellectual Skills	<ul style="list-style-type: none"> • More active learning processes • Assignments or projects • Group-learning activity such as a seminar or tutorial
Subject Specialist Skills	<ul style="list-style-type: none"> • Application in context • Workbooks or guidance manuals may also be used to support learning.
Key Skills	<ul style="list-style-type: none"> • Through naturally arising opportunities within the curriculum e.g. written communication skills through essays or dissertations • Oral communication skills through presentations in seminars • Team working skills through collaborative projects

What will my timetable look like?

The table below shows the basic structure of your Programme.

Your lectures will usually be spread over one day with lessons starting at 8:30 am and potentially finishing as late as 18:30 pm.

Pearson BTEC Level 4 Higher National Certificate in Construction and The Built Environment (Civil Engineering)		Unit credit	Level
Core Unit <i>Mandatory</i>	1 Individual Project (Pearson-set)	15	4
Core Unit <i>Mandatory</i>	2 Construction Technology	15	4
Core Unit <i>Mandatory</i>	3 Science & Materials	15	4
Core Unit <i>Mandatory</i>	4 Construction Practice & Management	15	4
Specialist Unit <i>Mandatory</i>	6 Construction Information (Drawing, Detailing, Specification)	15	4
Specialist Unit <i>Mandatory</i>	8 Mathematics for Construction	15	4

Specialist Unit <i>Mandatory</i>	20 Principles of Structural Design	15	4
Optional Unit	7 Surveying, Measuring & Setting Out	15	4
Optional Unit	18 Civil Engineering Technology	15	4
Optional Unit	21 Site Supervision & Operations	15	4

How will I be Assessed?

	Assessment Method
Knowledge and Understanding	<ul style="list-style-type: none"> • Most methods require some demonstration of knowledge and understanding
Intellectual Skills	<ul style="list-style-type: none"> • Problem-based exercises • Independent project work • Research dissertations
Subject Specialist Skills	<ul style="list-style-type: none"> • Application in context • Practical demonstration of skill
Key Skills	<ul style="list-style-type: none"> • These will be embedded within the curriculum • E.g. written communication skills through essays or dissertations • Oral communication skills through presentations in seminars • Team working skills through collaborative projects

What Are My Responsibilities As A Student?

It is your responsibility to manage your personal and professional development. You will be mentored and supported in this by the personal tutor. The amount of support given will be driven by your needs, as determined by you and / or Unit tutors, and is therefore expected to decrease in quantity and nature as you progress through the course and become more independent.

HNC/Ds are vocational courses which prepare you for working in a professional environment as well as to undertake further study. These courses require you to behave in a professional manner, in much the same way as you would in a working environment. Therefore we expect your attendance rate to be high, and that if you have to miss a class for some unavoidable reason, you inform your Curriculum Leader, and make arrangements to catch up the class you miss. Our courses move at a fast pace, and there is a strong relationship between good attendance and success.

Group work is a key component of all courses, and will form part of your assessment. Good attendance enables you to build working relationships with your peers and play your full part in collaborative activities. Being able to work as part of a team is an important employability skill, and is highly valued on our courses.

For all these reasons, your personal tutor will monitor your attendance and, should an issue arise for any reason, will help you to action plan so that you get back on track. However, it is your personal responsibility to ensure that you attend, and in particular that you **do not take holidays during term time**. To help you with your planning, you will receive a college calendar at induction.

The College reserves the right to withdraw you from your course should your attendance pattern indicate a lack of commitment to your studies with the likelihood that you will not successfully complete the course. If you do not attend for 4 consecutive weeks, or have a pattern of haphazard attendance, you will be withdrawn and the student loans company will be informed. This will result in your funding being stopped, and you will owe the college the balance of any unpaid fees.

It is your responsibility to keep a copy of all written coursework submitted.

What Support And Help Can I Get?

Your personal tutor is there to support and guide you on your learning journey and is your first point of contact if you have any concerns or need to access support, counselling or careers guidance. Your personal tutor will be responsible for writing your reference when you apply for further courses or employment. You will be given contact details for your personal tutor during induction.

You will receive academic support from your Unit tutors. This may take the form of face to face academic tutorials, advice surgeries and appointments or remotely by telephone or email conversations and conferences on the college intranet. Never be afraid to ask for help or advice - we are here to support you. Unit tutors will provide you with contact details during the first lesson.

Other Sources of Support

During induction you will be given details of all the support services which the college provides. Each Campus has a Student Services base staffed by a manager and a team of staff who are there to support you throughout your time at College. This team of staff includes our own Educational Guidance Advisors who can advise you about appropriate courses, careers etc. As a student of the college you have access to free and confidential counselling where you may find it helpful to talk to someone who won't judge you.

The College offers a wide range of assistance to learners with additional needs. We believe that everyone should be enabled to learn effectively and have access to College facilities.

Learners with additional needs include people with:

- physical or mobility difficulties
- visual impairment e.g. blind and partially sighted
- hearing impairment e.g. deaf or hard of hearing
- communication difficulties e.g. Autistic and Asperger syndrome
- learning difficulty e.g. dyslexia, ADHD
- medical condition e.g. epilepsy, diabetes and heart disease
- mental health difficulties e.g. depression and anxiety

In order to access specialist support you must apply for Disabled Students Allowance. You need to complete an online [application form](#) and send the documents requested to Student Finance England, who will assess your claim. If successful, they will fund you to attend an assessment centre where your particular support needs can be assessed. For more information visit [Disabled Students' Allowances](#). If you need help with the process, contact Liz Escadale, the HE Disabled Student Advisor, on 0114 2602075.

How Can I Find Out More?

The College has a dedicated specialist University Centre to service HE students. This is your first point of contact for all administrative queries. The administrator, Sue Fletcher can be contacted on 0114 260 2597 susan.fletcher@sheffcol.ac.uk Sue will either be able to answer your query herself, or give you the contact details of the appropriate person to help you. Working with the administrator is the Head of HE and Access, Steve Tipping, who can be contacted on 0114 260 2587 stephen.tipping@sheffcol.ac.uk.

4. Course Specific Information

Course
Pearson BTEC Level 4 HNC Diploma in Construction and the Built Environment (Civil Engineering)
Additional Costs
Equipment
1. External Hard Drive and or Memory Stick 2. Scientific calculator 3. Digital Camera 4. Home Computer 5. Drawing Equipment 6. Outdoor clothing
Printing /Reprographic Costs
None all electronic submissions
Residential Trips
Soils laboratory as part of the course content.
Please include any other course specific information not given elsewhere

5. Assessment

5.1 Assessment Schedule

Deadlines will be given for each unit during the first lesson for that module, and published in unit guides and the course assessment schedule.

5.2 Assessment Regulations

All HE students are entitled to have access to fair assessment. The College follows QAA and Awarding Body guidance regarding reasonable adjustments and special considerations. Teachers, trainers and assessors will follow the procedures, and design assessment instruments that give all candidates the fairest possible opportunities to show attainment. Internal verifiers will check that assessments give all students equal opportunities to show attainment, and that there is no discrimination or bias in the design or format.

All courses have a Review Board at the end of each semester. These boards confirm your results for all completed modules, and for the award at the end of the course. [Pearson BTEC HNC/D regulations](#) require us to specify a set of rules that all HNC/D programmes adhere to, and which are considered during the Review Board. These rules are listed below:

- all students must meet the pass or merit or distinction criteria to achieve each unit
- if there are exceptional circumstances explaining why a student is unable to meet deadline dates, the decision to defer outstanding work must be agreed by an Exceptional Circumstances Panel. It follows that the Exceptional Circumstances Panel must meet prior to the Review Board.
- If a student does not achieve the pass standard for the first submission of summative assessment of the unit, s/he will be given a refer grade, and will be required to resubmit work by a clearly stated deadline. The grade awarded will depend upon the student profile for the unit.
- the outcome of the refer work will be discussed at the next Review Board; if still not at the required standard, the student will fail the unit and will need to re-register, subject to the unit's availability
- if it is not possible for a student to retake all re-registered units during the planned 2 years, then a decision to allow a student to continue for a 3rd year of the course may be taken at the discretion of the Assessment Board
- all students are to be provided with feedback on their work within 3 weeks of the deadline date
- units that are assessed using group work must also include measurable assessment of the contribution of each individual student

Standards Verifiers consider samples of student work to verify quality and standards. The Review Board will consider their comments about these samples whether or not it is possible for the Standards Verifier to attend in person. Each Review Board must also report progress on actions taken in response to any Standards Verifier recommendations.

No discussion of individual results or counselling of students takes place prior to the Review Board. Discussions that take place during the Review Board are strictly confidential. Only the board decisions are reported to you.

Your Standards Verifier is Dr John Lonsdale. His email is john.lonsdale@northumbria.ac.uk

5.3 Extenuating Circumstances

The Sheffield College's Extenuating Circumstances Policy and Procedure is intended to provide support if you experience unexpected and unanticipated difficulties during your time as a student which adversely impacts on your studies and your ability to complete assessments or complete them to your usual standard.

If you are experiencing such difficulties, please refer to the Extenuating Circumstances Policy and Procedure for guidance and speak to a member of the teaching staff about your specific situation. They will be able to advise which procedure you need to follow and who to submit the relevant paperwork to.

The Extenuating Circumstances Policy and Procedure is available here, <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Extenuating Circumstances Policy & Procedure*. You will also find a link on your Moodle/Google classroom VLE site.

You should read this information if you are experiencing personal problems, for example, if you are ill, have been in hospital, have experienced an exceptional family emergency or are suffering from exceptional stressful life events, and they are having a significant impact on your ability to study.

Whilst studying with us you may well encounter some of the difficulties of life experienced by most people, such as ill-health or personal issues. Normally you will be able to overcome or manage these without any impact on your ability to study and complete assessment.

Occasionally however you might experience ill-health or personal issues that are exceptional in nature and which have a significant impact on your ability to study and to complete assessment. **We define these as extenuating circumstances.** Generally such circumstances will occur suddenly, will be unexpected and are beyond your immediate control to overcome or manage due to their severity and/or timing.

Our policy is to help you where we can to mitigate the impact of your extenuating circumstances on your studies and to consider all requests for help sensitively, fairly and equitably.

It is important you inform us as soon as you are aware that your studies and/or ability to take assessment are being affected by ill-health or personal issues. You should contact your **HE Curriculum leader** immediately if your circumstances are preventing you from attending classes or are affecting your ability to complete assessment. We understand you might not always feel comfortable doing this particularly when your circumstances are of a personal and sensitive nature. However we encourage you to do so. Any information you disclose will be handled in confidence.

The appropriate mechanism to help mitigate the impact of your circumstances will depend on the timing and severity of those circumstances.

- Where the circumstances occur close to a coursework submission deadline and are of the type that can quickly be overcome, you can request a short extension to that deadline.
- Where your circumstances will prevent any sustained meaningful engagement with your studies, then you can request a planned break in studies.
- Where your circumstances are having a detrimental impact on your ability to attempt or reach a pass standard in an assessment task, you can request to repeat your attempt at that assessment task.

We will consider any request sensitively, fairly and equitably based on the extent to which you have:

- Submitted the request in a timely manner.
- Clearly stated the nature of your circumstances and the impact they are having on your ability to study and take assessment.
- Provided appropriate documentary evidence where it can be reasonably obtained.

The Sheffield College will support students in completing a Request Repeat Assessment Task (RRAA) form.

The Sheffield College will hold Extenuation Circumstances Panels (ECPs) to determine if students RRAA will be accepted or declined following the Extenuating Circumstances Policy and Procedure process. The Sheffield College will confirm RRAA outcomes to students.

NB: The following list indicates the type of situations which do not meet the definition of extenuating circumstances because we believe they can be avoided or that you can act to limit the impact. The list is not exhaustive.

Medical

- *long-standing medical conditions (as these should be covered by a Learning Contract)*
- *planned health appointments*
- *minor ailments such as a cold*

Personal

- *the break-up of a short-term relationship*
- *financial difficulties*
- *attending or taking part in sporting events*
- *holidays or travel*
- *moving house*
- *normal domestic issues*
- *work commitments for fulltime students reducing time available for study and coursework*
- *voluntary work*
- *weddings*

Study related

- *completing coursework too late and missing deadlines*
- *losing coursework*
- *not following the assessment timetable*
- *transport difficulties which could have reasonably been avoided*
- *withdrawal of IT facilities as a result of being in debt to the College*

- *circumstances that affect another individual in relation to group work*
- *English being a second language*

For further information, please refer to The Sheffield College *Extenuating Circumstances Policy and Procedure*, a copy of which can be obtained from your HE Curriculum Leader.

5.4 Malpractice

Malpractice is any form of cheating, including plagiarism, collusion, impersonation and the use of inadmissible material. It is a breach of the College's Assessment Regulations. If malpractice is suspected, it will be established beyond all reasonable doubt before any formal sanction is imposed. The College views all instances of malpractice, including plagiarism, as a serious offence, and will respond to all allegations of malpractice in accordance with [Pearson BTEC HNC/D regulations](#). This may require the College to report any suspected malpractice to the Awarding Body. It may also require the College to investigate, in which case the Student Disciplinary procedure will be used. Instances of malpractice that are upheld following investigation, will lead to disciplinary action.

For full details of the policy and procedures regarding Academic Misconduct, see <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Assessment Malpractice Policy & Procedure*. You will also find a link on your Moodle/Google classroom VLE site.

Malpractice includes:

Misconduct, for example:

- any form of impersonation
- falsification, fabrication or alteration of results, certificates or assessment evidence
- failure to follow Awarding Body regulations [Pearson BTEC HNC/D regulations](#) or the instructions or advice of assessors, supervisors or invigilators
- misuse of assessment or examination material
- taking unauthorised material into assessment rooms
- obtaining, receiving, exchanging or passing on assessment-related information during assessment sessions
- behaviour that disrupts or undermines the integrity of assessment
- any form of cheating to gain an unfair advantage
- deliberate destruction of another person's work
- resubmitting previously graded work

Collusion

- unauthorised co-operation between a learner and another person, in or outside of College, in the preparation and production of work that is eventually submitted by one or both learners as the outcome of his or her individual efforts
- allowing another student to copy your work
You should not be discouraged from teamwork, as this is an essential key skill for many subject areas. However, methods of avoiding collusion, for example, the use of minutes, allocating tasks, agreeing outcomes, etc, are an essential part of team work, and the requirement to use such methods must be made clear to all students.

Plagiarism

Plagiarism is where a student submits someone else's work as if it is their own.

- copying work (artwork, images, artefacts, products, designs, words) from a published source and presenting the copied work as if it were the student's own
- the use of another person's work (artwork, images, artefacts, products, designs, words), with or without permission, without appropriately acknowledging the source

Examples of plagiarism include:

- copying from published text without an acknowledgement of source
- copying images, graphs, tables, art, music etc, without acknowledging the source

- copying small or large sections of assignments from other learners;
- downloading original material from the internet without acknowledging the source
- imitating too closely an existing work of art or music, design idea or concept

5.5 Appeals

Appeals may be made against the decisions e.g. on assessment, the decisions of a Review Board, Extenuating Circumstances Panel or Academic Conduct Panel, on the grounds stipulated in these regulations, no later than 10 days from receiving the decision against which you wish to appeal.

For full details of the appeals regulations, see <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Academic Appeals Policy & Procedure*. You will also find a link on your Moodle/Google classroom VLE site. You are advised to read these regulations in full.

Grounds for appeal can relate to decisions made about procedures such as:

- exceptional extensions
- extenuating circumstances
- academic misconduct

Grounds for appeal can include:

- that there was an error or irregularity in the process
- that the decision was not in accordance with the relevant regulations
- that the person or panel making the decision did not take sufficient account of the circumstances

Failure to follow College procedures and deadlines does not in itself constitute grounds for an appeal. The appeal process should not be used as an opportunity to simply re-enter the procedure under consideration, and documents etc., originally submitted after the relevant deadlines, that were not considered when the original decision was taken, will not necessarily be taken into account during the appeal.

You cannot appeal against an academic judgement of the marks awarded but you may request confirmation of their validity if you think there has been an error or irregularity. You are therefore strongly advised to discuss the nature of the appeal with appropriate members of staff.

Assessment Appeal

If you are not happy with your provisional grades, you must discuss your concerns with the subject tutor in the first instance. He or she will then discuss the reason for the decision for awarding the provisional grade. If you are still not happy with the outcome of discussions over provisional grades with your tutor, then discuss your concerns with the Curriculum Leader. He or she will discuss the decision with the subject tutor and/or an internal verifier. If you are still not fully satisfied with your provisional grade, the matter can be pursued in line with the College Appeals Policy.

Stage 1

1. If you disagree with the assessment decision you must explain the reason, in writing, as soon as possible.
2. The tutor must consider this and provide you with a response e.g.:
 - Clear explanation of the assessment decision following re-evaluation of the evidence, or

- If appropriate, amendment of the assessment record.

If you agree with the decision then the Appeal does not need to progress further but if you remain unhappy with the decision reached, the Appeal must proceed to Stage 2.

Stage 2

The tutor will pass all of the relevant information to an appropriate curriculum specialist via the moderation procedure, which will examine all the issues and evaluate the original decision. If you are still unhappy with this decision you can go to Stage 3.

Stage 3

Within 10 working days of the decision from Stage 2 your work will be passed to an external manager who will consider your Appeal. The decision reached is final.

If necessary, the matter can be referred to the Awarding Organisation Pearson (<http://qualifications.pearson.com/en/contact-us/feedback-and-complaints.html#tab-LearnersPearson.com>.) and also, the Office of the Independent Adjudicator (OIA) <http://www.oiahe.org.uk>.

5.6 Complaints

Complaints Procedure

The Sheffield College is committed to providing a high quality, educational experience and aims to provide a supportive environment, responsive to any concerns raised by students. Students should feel able to make a complaint relating to the action, or lack of action, or about the standard of a service or facility provided to students of the College. The procedures are intended to ensure that all complaints are treated fairly and consistently and, wherever possible, to resolve the matter to the complainant's satisfaction. Full details of the Complaints Policy can be seen here, <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Complaints Policy*.

The College complaints procedure has two stages:

1. Informal stage - resolving a concern through informal discussion
2. Formal stage - resolving a concern through the formal complaints procedure, of which there are three possible stages

Full details of the two stages, and who to approach for help and advice, can be seen here <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Complaints Procedure*.

Informal Stage

Most concerns are straightforward and can be resolved quickly with staff directly involved without the need to complete and submit a complaint form. Therefore, in the first instance, having considered the responsibilities of both students and the College as detailed within the [Student Charter](#), any concerns/issues should be discussed, informally, with the person concerned or another member of staff. For example, if your complaint concerns teaching/tutorial matters you may wish to talk to your tutor or other members of teaching staff. If your complaint is about a service, then you should talk to an appropriate member of staff from that service. You could also consider raising your concern via the student forums.

If you are not sure who to speak to, or you do not feel able to approach the person most directly involved, you can seek advice regarding this from your Tutor Mentor, Deputy Head of Department, or from the Students' Union which acts independently of the College. You can contact the Students' Union on 0114 2602188 or email to studentsunion@sheffcol.ac.uk or call into one of the reception areas to make an appointment. At this point managers may wish to speak to staff involved and also obtain further guidance from Human Resources.

If a satisfactory resolution is not found informally, students are entitled to proceed to the College's formal complaints procedure.

Formal Stage

Stage 1

You should complete a Registration of Complaint form, copies of which can be obtained from College reception areas, or you can complete the online form via the College website <http://www.sheffcol.ac.uk/About/Public-Documents/Complaints>. You can ask a member of staff for help to complete the form or ask a friend, parent, carer or a representative of the Students' Union to submit a complaint on your behalf but we would require written agreement from you.

In addition to personal details and other information on the form, you will need to provide:

- details of the complaint
- an explanation of the steps you have already taken to try to resolve the complaint informally and why the responses you have received are not satisfactory
- where applicable, the outcome you would like from your complaint
- any supporting evidence (ie, copies of emails, notes of meetings, references to procedures, handbooks etc).

It is important to keep a copy of the completed form and other documentation submitted for your own records. Completed complaint forms should be submitted to any campus reception area or by email to collegecomplaints@sheffcol.ac.uk.

Within 5 working days of receipt of your complaint form, you will receive an acknowledgement. Your complaint will be considered to determine that the complaints procedure is appropriate and if so, it will be referred to a senior member of staff who will manage your complaint, ensuring that necessary action is taken and monitoring it through to completion.

After a further 10 working days you will receive a letter informing you of the progress of your complaint. We aim to complete the enquiry and reach a conclusion within 30 working days of receipt of your complaint form. If this is not possible you will be informed of the progress made. Complaints identified as requiring particularly speedy resolution will receive special attention.

You may be invited to attend a meeting to consider your complaint. You may bring a friend or representative to support you and/or for assistance but they cannot be a professional employed to act on your behalf.

Matters raised in a formal complaint will remain confidential to those directly involved in the investigation (which includes any members of staff concerned). All staff and students who become aware of any of the issues involved in a formal complaint are required to keep this information confidential (except as is necessary to progress, investigate or respond to the complaint). Failure to do so may result in formal disciplinary action being taken. However, there may be occasions when it is not possible to maintain confidentiality, for

example if another person is at risk. In such cases the situation will be explained to the complainant and/or the representative.

If your complaint is upheld you will be informed how and when any resolution or redress will be implemented. If the complaint is not upheld you can expect to receive clear reasons why this decision has been reached and advice on further action available to you including a review of the process of the complaint by the awarding body where appropriate (see Stage 2 below).

Stage 2

If you are not satisfied with the outcome of Stage 1, you can write to the Chief Executive, within 10 working days of receipt of the letter informing you of the outcome, to apply for a review of the process by the awarding/validating organisation. You should state the reason(s) why you are dissatisfied. Correspondence should be sent to the Chief Executive, c/o PA to the Chief Executive, Sheffield College, Granville Road, Sheffield S2 2RL.

Within 10 working days of receipt of your letter you will be informed of the action to be taken to review your complaint and any action you may need to take directly with the awarding/validating organisation.

Feedback

In accordance with the Student Charter, at the end of the two formal stages, you will be invited to complete a short evaluation of the process.

Stage 3

Following the action taken at Stage 2 (and not before), if you still feel that the matter has not been resolved to your satisfaction, having exhausted the College's procedures you may wish to contact Pearson, the Awarding Organisation, to refer the matter further.

<https://qualifications.pearson.com/en/contact-us/feedback-and-complaints.html>

If not resolved to the complainant's satisfaction, Higher Education students can apply for a review of their complaint to The Office of the Independent Adjudicator for Higher Education (OIA) <http://www.oiahe.org.uk>

5.7 Marking Arrangements

When you are set coursework, you will be given the deadline by which it is to be submitted. It is vital that you ensure you know the date, time and place for submission of coursework. Failure to meet a deadline counts as non-submission, and has serious repercussions.

It is your responsibility to keep a copy of all written coursework submitted. Your work will be marked by the unit tutor, and a sample will be internally verified by another member of staff. In addition, the Standards Verifier will sample work from all units.

You will receive feedback and marks for your work within 3 working weeks of submission. If for any reason this is not possible, you will be informed of the reason and given a date when work will be returned. The feedback you receive will be both written and oral, and forms a vital part of the learning process. Do make sure that you fully understand the feedback given, so that you can use it to improve your future work. Do not hesitate to ask the tutor if you need further guidance and explanation of your marks.

Please note that any marks you receive as part of the feedback process are provisional until confirmed by the Standards Verifier at a Review Board.

5.8 Guidance on Referencing

Accurate and consistent referencing is essential in all academic work. Whenever you refer to either the work or ideas of someone, or are influenced by another's work, you must acknowledge this. Similarly if you make a direct quotation from someone's work this should be referred to accurately.

There are a number of systems of referencing. The system you will use on this course is called the Harvard System. This system is described in the guides which can be found via the link below.

<http://ladatastore.shu.ac.uk/RefGuideV7.pdf>

Referencing is a skill which improves with practice. It is a very important part of your academic development. The guides are comprehensive and explain how to reference any information source. Your tutor will give you feedback on your referencing in assignments to help you develop your referencing skills.

5.9 Notification of Results

At the end of each semester there will be a Review Board, which is chaired by the Head of HE and Access at the College, and attended by the HE Curriculum Leader and unit tutors from your course. The Standards Verifier is often, but not always present also. Whether or not the Standards Verifier attends the Board they will have reviewed samples of your assessed work.

These Review Boards consider your marks and confirm whether or not you have passed each unit, or whether you are awarded the Higher National Certificate. The Sheffield College University Centre normally sends out results letters within 2 weeks of the Review Board meeting.

Further information regarding Review Boards can be seen here, <https://www.sheffcol.ac.uk/about-us/terms-and-conditions> and click on *Review Boards Policy & Procedure*.

5.10 Provision of Certificates and Diploma Supplements

On successful completion of the course, your results are submitted to Pearson, who will issue your Certificate to the college. It is vital that you ensure TSC University Centre always has your current address so that these important documents go to the correct address.

You must notify TSC University Centre if you change either your term time or the permanent address given at enrolment.

5.11 Graduation

During the summer following successful completion of your course you will receive an invitation to attend our graduation ceremony. This is a memorable occasion where family and friends join you and your tutors to celebrate your achievements. Our media students usually film this event to capture the moment when, wearing your cap and gown, you shake hands with the guest speaker and receive your scroll. They film interviews with students and tutors. The college photographer also takes group shots of graduates. The resultant DVD is sent to all those attending graduation. The ceremony takes place in the autumn following successful completion of your course.

6. Learning Resources

All college campuses provide Wi-Fi access so that you can connect your own devices. There are drop in sessions at all college campuses to help you if you experience difficulties.

6.1 Access to College Resources

Learning Resource Centres (LRCs) provide open access to resources, study space and computing facilities, in a pleasant and welcoming environment. You will find a Learning Resource Centre located at all of the College campuses - Hillsborough, Peaks and Sheffield City College. Opening times can be found on the college website, in our information leaflets, and are displayed in each centre, as well as 24/7 electronic access where available.

It is our aim to make the LRC a flexible service, giving support throughout your time in college. Regular Student Forum meetings are held, where we welcome feedback and suggestions from students in order to improve our service.

LRCs provide you with an extensive range of resources to support your learning, including:

- Books, magazines and newspapers
- DVDs, multimedia, online and electronic resources
- Study support materials and learning packages
- Internet access, including Wi-Fi to connect your own device. Secure access to online resources is provided through an authentication service (currently Shibboleth) and the college VLE / Moodle found via the link <http://vle.sheffcol.ac.uk/moodle/course/view.php?id=3913>
- Resources can be produced in alternative formats and equipment can be loaned to make the most of mobile learning technologies.

You will be able to borrow many of these resources but others are available only for use in the LRC. Equipment is provided where necessary so that you can access the resources e.g. DVD players and computers.

In each LRC we have dedicated staff available to support students' learning needs:

- Study Assistants are available during working hours for face to face support, and questions can be sent via email to be answered by the next available assistant.
- Study Assistants also offer small group workshops on particular study skills - for example: referencing; researching a subject; effective internet searching, etc.
- Staff are appropriately trained and keep up to date by attending regular updating sessions.

The LRC staff can help you with your study and research skills, and have specialist knowledge of the resources available in your subject area. The team can provide training in a range of library related information skills to enable you to use resources effectively to support your studies. During induction you will be given a tour of the facilities and have the opportunity to meet the staff.

Your access to the College's IT facilities is by means of a Student Account. Full-time students will create this as part of induction; part-time students should do this on their first visit to the LRC. Students are given a small starting balance on their printing and photocopying account. When that has been used, further credits can be purchased.

You can pre-book a computer to work on at any of the LRCs, so that you know a PC will be available when you need it.

The [library catalogue](#) and details of all the services offered are available from all college LRCs, or online in the LRC sections of the [college website](#).

All students of the Sheffield College can borrow from any campus LRC. In order to borrow resources, students must bring their student card to the issue desk. Students are required to show their student card to gain access to College campuses.

Each student can borrow a total of up to 10 items, which may include:

Type of Loan	No. of items	Loan Terms
Ordinary Loan	Up to 10 items	3 Weeks
Short Loan	Up to 5 items	1 Week
Reference	Discretionary	Discretionary

The loan period is designated depending on the nature of resource and likely demand. The loan period may be changed following consultation with colleagues, or in periods of high demand.

Ordinary and short loan items can be renewed once, either by calling in to the LRC, by email, or by telephone. Reserved and overdue items will not be renewed.

Fines are charged for overdue items. Costs for lost or damaged items are the full cost of replacement, or is negotiable if the advertised price is not available.

Students can reserve items that are on loan to somebody else at the issue desk. If a resource is not available at their own centre, LRC staff can request it from another centre. This may take up to 5 working days. If your request cannot be satisfied within the college LRCs, we have access to a range of inter-library loan schemes, including links with the British Library.

The Learning Resource Centre Charter

We are here to help you be successful students - this is what we do for you:

Each working day we can give you:

- A welcoming place to study
- A wide range of books, journals, audio-visual materials and online resources relevant to your subject or course, most of which you are able to borrow
- A range of subject and study guides to support your learning
- Information Assistants to help you with your enquiries and information needs
- Study Assistants to help with your course work and IT enquiries
- Computers for you to use for your college work
- Wi-fi access for you to connect your own learning devices
- Photocopiers, printers and a range of learning equipment for you to use
- Access to all Sheffield College Learning Resource Centres to use their facilities
- Help in finding resources kept in other Libraries and Information Services

When you are not in college you can access many of our services 24/7:

- You can log in to our online services using your college user name and password
- You can email queries to us, to be answered when we are next working
- Our online catalogue helps you find resources in advance of your next visit
- We have a growing collection of e-books and e-journals for your course
- You can find our useful information guides through your Moodle/Google classroom VLE site

In return, this is what you can do for us:

- Ask us for any help that you need
- Take anything you want to borrow to the LRC desk with your Student ID Card
- Take care of any resources you use or borrow, and return them on time so they are available for other students to use
- Pay for any loss or damage caused to resources or facilities in your care, and the fines due on any items you didn't return on time
- Use the computers for course work only so they can be used by others too
- Respect the needs of other students and staff by keeping noise to a minimum for a pleasant and peaceful working atmosphere
- Use the LRC as a learning place - please don't bring food or drinks in
- Help us contribute to the environment by not wasting resources
- Tell us if you have any ideas on how we can improve our services

We aim to provide an efficient and effective LRC service. Your suggestions and comments are welcome.

7. Opportunities to Engage in Quality Assurance of the Course

7.1 Student Representation

You are invited to send representatives to attend Course Committees, where issues relating to the running and development of the course are discussed by teaching teams. At these meetings students can raise any concerns they have, so that prompt action can be taken to resolve matters. In addition, your personal tutor will discuss any concerns which arise during group tutorials, and report back on action taken. Student representatives are also invited to attend the course review at the end of each academic year.

The college employs a Student Involvement Facilitator, who calls termly meetings of the HE Student Forum, to which you are invited to send representatives. The Forum discusses non-course issues which are then raised with the appropriate college manager, who provides feedback to the next meeting. The Student Forum elects a lead Student representative, who represents the student voice at the HE Strategy Group (consisting of senior managers and directors). The HE Student Forum is invited to make a submission for the Higher Education Review (HER) conducted by the Quality Assurance Agency (QAA). This submission helps the review team to understand what it is like to be a student at the College. There is a brief guide to student involvement in HER, and the role of the Lead Student representative on this section of the [QAA website](#).

Higher Education students elect a representative to sit on the Student Union.

7.2 Student Surveys

The College conducts an annual HE Student Survey, where you are asked to respond to a series of questions about the quality of teaching and learning on your course. In addition, you are asked to complete unit evaluation surveys at the end of each unit in order to help us to continuously improve. The results of these surveys are fed into the Annual Quality Review process, and action plans are devised which take account of student opinion. You will receive feedback on the action arising from these surveys through your representatives on course committees and your personal tutor during group tutorials.

7.3 Complaints Process

Definition

A complaint is an expression of concern or dissatisfaction with any aspect of the College's provision that requires a response. Complaints concerning assessment and accreditation may sometimes be dealt with through the college Appeals procedures and those set up by awarding/validating organisations.

- For further details of the Appeals procedure, please see paragraph 5.5 of this handbook.
- For further details of the Complaints procedure, please see paragraph 5.6 of this handbook

8. Opportunities for Further Study

8.1 Opportunities at the Sheffield College

Details of courses suitable for Higher National graduates, including professional courses, can be found in the online HE prospectus, <https://www.sheffcol.ac.uk/courses/he-professional-guide>

If you are uncertain about what you need to study next to progress your career, you should book an interview with one of our careers guidance staff at student services reception.

8.2 Other Opportunities

You can apply to 'top up' your Higher National to an honours degree at any university offering the course. You should research their entry requirements via the UCAS and university websites, where you will also find details of the application process; some courses will require you to apply through UCAS, whilst others may ask you to apply direct to the institution. Student services hold hard copy prospectuses.

If you are a full time student, you may also consider going directly into employment, in which case you should book a careers interview to discuss the opportunities for trainee graduate and internship positions. Careers advisors can also help you with your job search and recommend sources of information such as graduate recruitment fairs.

9. Units of Study

Unit 1: Individual Project (Pearson-set)

Unit code R/615/1387

Unit type Core

Unit level 4

Credit value 15

Introduction

The ability to define, plan and undertake a project is a critical set of skills needed in various roles within the construction industry. Identifying appropriate information and analysing this, to formulate clear results or recommendations, is required to underpin many of the processes that inform construction projects.

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

Students will be able to identify, define, plan, develop and execute a successful project by working through a clear process. They will develop a project brief; outlining a problem that requires a solution, as well as a project specification, the specific requirements of which the final outcome must meet. They will research the problem, undertaking a feasibility study, and consider a range of potential solutions using critical analysis and evaluation techniques to test, select and contextualise their preferred solution. Students will provide a work and time management plan, keeping a diary of all activities, reflecting on their process and their learning throughout the project.

Learning Outcomes

By the end of this unit students will be able to:

1. Formulate a project that will provide a solution to an identified problem.
2. Manage a project within agreed timescales and specification; documenting the process throughout.
3. Evaluate potential project management solutions.
4. Produce a project report and deliver a presentation of the final project outcomes.

Essential Content

LO1 Formulate a project that will provide a solution to an identified problem

Project identification
Research methods
Feasibility Studies
Brief and specification

LO2 Manage a project within agreed timescales and specification, documenting the process throughout

Resources and resource planning
Costs and cost planning

Work plan:
Gantt charts.
Project Evaluation and Review Technique (PERT) charts.
Critical Path Method (CPM).

Project tracking:
Progress tracking.
Milestones.

LO3 **Evaluate potential project management solutions**
PERT analysis
CPM analysis

LO4 **Produce a project report and deliver a presentation of the final project outcomes**
Report formats
Presentation techniques

Learning Outcomes and Assessment Criteria

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

Recommended Resources

Textbooks

BALDWIN, A. (2014) *Handbook for Construction Planning and Scheduling*. London: Wiley-Blackwell.

BUSSEY, P. (2015) *CDM 2015: A Practical Guide for Architects and Designers*. London: RIBA.

CIOB (2010) *Guide to Good Practice in the Management of Time in Complex Projects*. London: Chartered Institute of Building.

GOETSCH, D. L. (2011) *Construction Safety & Health*. London: Pearson.

KELLY, J. and MALE, S. (1992) *Value Management in Design and Construction: The Economic Management of Project*. London: Taylor & Francis.

POTTS, K. and ANKRAH, N. (2014) *Construction Cost Management: Learning from Case Studies*. London: Routledge.

LAWSON, B. (2005) *How Designers Think: The Design Process Demystified*. London: Routledge.

WYATT, D. (2007) *Construction Specifications: Principles and Applications*. New York: Delmar.

Links

This unit links to the following related units:

Unit 5: Legal & Statutory Responsibilities in Construction

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

Unit 2: Construction Technology

Unit code	Y/615/1388
Unit type	Core
Unit Level	4
Credit value	15

Introduction

The basic principles of construction technology have not changed for hundreds of years. However, the materials and techniques used to achieve these basic principles are constantly evolving; to enable the construction industry to deliver better quality buildings. Scarcity of resources and the continuing demand of more sophisticated clients, end users and other stakeholder interests, are driving the construction industry to provide buildings which facilitate enhanced environmental and energy performance, and greater flexibility, in response to ever increasing financial, environmental, legal and economic constraints

This unit will introduce the different technological concepts used to enable the construction of building elements; from substructure to completion, by understanding the different functional characteristics and design considerations to be borne in mind when selecting the most suitable technological solution.

Topics included in this unit are: substructure, superstructure, finishes, building services and infrastructure components. On successful completion of this unit a student will be able to analyse scenarios and select the most appropriate construction technology solution.

Learning Outcomes

By the end of this unit students will be able to:

1. Explain the terminology used in construction technology.
2. Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria.
3. Identify the different types of civil engineering/infrastructure technology used in support of buildings.
4. Illustrate the supply and distribution of a range of building services and how they are accommodated within the building.

Essential Content

LO1 Explain the terminology used in construction technology

Types of construction activity:

Low, medium and high rise buildings, domestic buildings, for example house, flats and other multi-occupancy buildings, commercial buildings, for example offices and shops, industrial buildings, for example, light industrial and warehouses.

Construction technology terminology:

Loadbearing and non-loadbearing, structural stability, movement and thermal expansion, durability, weather and moisture resistance, aesthetics, fire resistance, sound insulation, resistance to heat loss and thermal transmission, dimensional co-ordination and standardisation, sustainability and scarcity of availability, on-site and off-site construction, legal requirements, buildability, health and safety.

Construction information:

Drawings, specification, schedules, CAD, Building Information Modelling (BIM).

Sustainability:

Supply chain.

Lifecycle.

'Cradle-to-grave'.

'Cradle-to-cradle'.

Circular economies.

LO2 Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria

Pre-design studies:

Desk-top, Site Reconnaissance, Direct Soil Investigation techniques.

Substructure functions and design considerations:

Different methods for gathering disturbed and undisturbed samples, influence of soil type on foundation design, including water and chemical content, potential loads, position of trees and the impact on foundations, economic considerations, legal considerations (health and safety work in excavations), building regulations, plant requirements.

Types of foundations:

Shallow and deep foundations, strip and deep strip foundations, pad foundations, raft foundations, piled foundations (replacement and displacement piles).

Types of superstructure:

Traditional construction, framed construction: steel, composite concrete and steel, timber.

Walls; roofs; structural frames; claddings; finishes; services.

Walls:

External walls: traditional cavity, timber frame, lightweight steel.

Cladding: panel systems, infill systems, composite panel systems, internal partition walls.

Roofs:

Pitched and flat roof systems, roof coverings.

Floors:

Ground floors, intermediate floors, floor finishes.

Staircases:

Timber, concrete, metal staircases, means of escape.

Finishes:

Ceiling, wall and floor finishes.

LO3 Identify the different types of civil engineering/infrastructure technology used in support of buildings

Site remediation and de-watering:

Contamination management: cut-off techniques, encapsulation.

Soil remediation: stone piling, vibro-compaction.

De-watering: permanent sheet piling, secant piling, grout injection freezing, temporary techniques, such as pumping, wells, electro-osmosis.

Substructure works:

Basement construction: steel sheet piling, concrete diaphragm walls, coffer dams, caissons, culverts.

Superstructure works:

Reinforced concrete work: formwork, reinforcement, fabrication, concrete, steel.

LO4 **Illustrate the supply and distribution of a range of building services and how they are accommodated within the building**

Primary service supply

Cold water, gas, electricity.

Services distribution

Hot and cold water, Single phase and 3-phase electricity, air conditioning ductwork.

Services accommodation:

Raised access flooring, suspended ceilings, partitioning, rising ducts.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Explain the terminology used in construction technology		LO1 D1 Evaluate how the functional characteristics and design selection criteria impact on the eventual design solution
P1 Describe the differences between residential, commercial and industrial buildings. P2 Explain how the functional characteristics and design selection criteria are informed by proposed building use. P3 Discuss the ways in which sustainability can be promoted in building projects.	M1 Apply the terminology used in construction technology to a given building construction project.	
LO2 Describe the different techniques used to construct a range of substructures and superstructures, including their function and design selection criteria		
P4 Describe the pre-design studies carried out and types of information collected for a given construction site. P5 Explain the functional characteristics and design criteria for primary and secondary elements of a building substructure and superstructure.	M2 Analyse how site conditions impact on the design of foundations. M3 Illustrate how the component parts of an element allow it to fulfil its function.	LO2 LO3 D2 Prepare a design report identifying superstructure, substructure and civil engineering structures necessary for a given building construction project.
LO3 Identify the different types of civil engineering/infrastructure technology used in support of buildings		
P6 Describe techniques used for remediating the site prior to construction commencing. P7 Describe the types of substructure works carried out by civil engineers.	M4 Compare different types of structural frame used to carry the primary and secondary elements of the superstructure.	

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

Recommended Resources

Textbooks

BRYAN, T. (2010) *Construction Technology: Analysis and Choice*, Oxford: Blackwell.

CHARTLETT, A. and Maybery-Thomas, C. (2013) *Fundamental Building Technology*. 3rd Ed. Abingdon: Routledge.

CHUDLEY, R. et al. (2012) *Advanced Construction Technology*. 5th Ed. Harlow: Pearson Education Limited.

CHUDLEY, R. and Grenno, R. (2016) *Building Construction Handbook*. Abingdon: Routledge.

FLEMING, E. (2005) *Construction Technology: An Illustrated Introduction*. Oxford: Blackwell.

Links

This unit links to the following related units:

Unit 3: Science & Materials

Unit 6: Construction Information (Drawings, Detailing, Specification)

Unit 7: Surveying, Measuring & Setting Out

Unit 14: Building Information Modelling

Unit 15: Principles of Refurbishment

Unit 18: Principles of Structural Design

Unit 25: Management for Complex Building Projects

Unit 27: Construction Technology for Complex Building Projects

Unit 35: Alternative Methods of Construction

Unit 46: Advanced Materials

Unit 3: Science & Materials

Unit code D/615/1389
Unit type Core
Unit level 4
Credit value 15

Introduction

Science and material performance are intrinsically linked through the need to create structures and spaces that perform in both mechanical operation and in providing human comfort.

This unit aims to support students to make material choices to achieve the desired outcomes of a brief. This is approached from the perspective of materials being fit for purpose; as defined by testing standards and properties, but also by consideration of the environmental impact and sustainability. Awareness of health & safety is considered alongside the need to meet legislative requirements.

The topics covered in this unit include: health & safety; storage and use of materials; handling, and problems associated with misuse and unprotected use; environmental and sustainable consideration in material choices; and human comfort performance parameters. Material choice is developed through the understanding of testing procedures to establish conformity to standards and define performance properties. The performance of materials to satisfy regulations and provide appropriate comfort levels is addressed through design and calculations.

Upon successful completion of this unit students will be able to make informed decisions regarding material choices; based on understanding the structural behaviour of materials established through recognised testing methods, sustainability, context of build, and health & safety. Students will also be able to perform the calculations necessary to establish anticipated performance of the materials in-use and therefore determine their compliance with regulations and suitability.

Learning Outcomes

By the end of this unit students will be able to:

1. Review health and safety regulations and legislation associated with the storage, handling and use of materials on a construction site.
2. Discuss the environmental and sustainability factors which can impact on and influence the material choices for a construction project.
3. Present material choices for a given building using performance properties, experimental data, sustainability and environmental consideration.
4. Evaluate the performance of a given building in respect of its human comfort requirements.

Essential Content

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

Regulations and guidance:

Health & safety management regulations.

Design management regulations.

Provision and use of equipment regulations.

Control and management of hazardous materials through storage, movement and use.

Materials handling and installation:

Risk assessments and method statements (qualitative and quantitative).

Materials storage: moving materials safely; working in confined spaces; working at height.

Occupational health risks associated with materials: asbestos-related and respiratory disease; dermatitis and skin problems; musculoskeletal disorders; hand arm vibration.

Personal Protective Equipment (PPE).

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

Environmental considerations:

Lifecycle assessment.

Environmental profile methodology.

Environmental product declaration and certification.

Embodied energy.

Waste management: the economics and technologies of construction waste disposal.

Sustainability:

Resource availability and depletion: renewable and non-renewable materials.

Reuse and recycling of construction and demolition waste.

Waste and Resources Action Programme (WRAP).

Environmental assessment methods:

Building Research Establishment Environmental Assessment Method (BREEAM).

Leadership in Energy and Environmental Design (LEED).

Green Star.

Estidama, or other forms of environmental assessment.

Construction Industry Research Information Association.

- LO3 **Present material choices for a given building using performance properties, experimental data, sustainability and environmental consideration**

Material testing:

Testing methods, interpreting test data.

Codes and standards.

Structural behaviours

Performance properties: strength, elasticity, toughness, hardness, creep, fatigue, porosity, brittleness, density, thermal conductivity, durability.

Inherent material properties.

Relationship between material properties, behaviour and use.

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

Human comfort provision:

Indoor environmental quality: thermal, illumination, sound, ventilation.
Thermal losses and gains.

Passive and active design: design solutions, environmental benefit vs implementation cost.

Calculations of u-values, lux levels, acoustic and ventilation.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p>LO1 Review health and safety regulations and legislation associated with the storage, handling and use of materials on a construction site</p>		<p>LO1</p> <p>D1 Discuss 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>LO2 LO3</p> <p>D2 Illustrate how the use of sustainable practices and considerations for material choice can improve the environmental rating of the completed building.</p>
<p>P1 Explain how regulations impact on the use, storage and handling of a selection of vocationally typical construction materials.</p>	<p>M1 Assess how risk assessments can be used to address significant hazards posed by selected materials or activities.</p>	
<p>LO2 Discuss the environmental and sustainability factors which impact on and influence the material choices for a construction project</p>		
<p>P2 Explain material environmental profiling and lifecycle assessment. Use a relevant material to exemplify your explanation.</p> <p>P3 Discuss the benefits of product declaration and environmental certification.</p>	<p>M2 Produce a waste management plan for a given project, taking into account a typical range of relevant waste materials.</p>	
<p>LO3 Present material choices for a given building using performance properties, experimental data, sustainability and environmental consideration</p>		
<p>P4 Present the results of relevant testing procedures to identify performance characteristics of selected construction materials.</p> <p>P5 Discuss the results in terms of the material properties and regulatory requirements, highlighting any unexpected results and why these may occur.</p> <p>P6 Select construction materials for a given building based upon their performance properties in use.</p>	<p>M3 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
L04 Evaluate the performance of a given building in respect of its human comfort requirements.		L04 D3 Evaluate how the use of passive or active strategies can minimise energy, materials, water, and land use.
P7 Define a material selection strategy with regard to human comfort requirements. P8 Identify materials for a selected area within a building and explain how these contribute to a balanced indoor environment.	M4 Perform calculations which relate to a selected area (lux levels, u-values, acoustic and ventilation).	

Recommended Resources

Textbooks

BLANC, A. (2014) *Internal components*. Abingdon: Routledge.

BUXTON, P. (2015) *Metric handbook: Planning and design data*. Abingdon: Routledge.

CASINI, M. (2016) *Smart buildings: Advanced materials and Nanotechnology to improve energy*. Duxford: Woodhead Publishing.

THOMAS, R. (ed.) (2006) *Environmental design: An introduction for architects and engineers*. Third Edition edn. London: Taylor & Francis.

CLAISSE, P, A. (2015) *Civil Engineering Materials*. Kidlington: Butterworth-Heinemann.

DEAN, Y. (1996) *Materials Technology*. (Mitchells Building Series). Abingdon: Routledge.

DORAN, D. and Cather, B. (2013) *Construction Materials Reference Book*. Abingdon, Routledge.

EVERETT, A. (1994) *Materials*. (Mitchells Building Series). 5th Ed. Abingdon: Routledge.

KATIB, J.M. (2009) *Sustainability of Construction Materials*. Abingdon: Woodhead Publishing Ltd.

LYONS, A. (2014) *Materials for Architects and Builders*. 5th Ed. Abingdon: ROUTLEDGE.

PACHECO-Torga, F. and JALALI, S. (2011) *Eco-Efficient Construction and Building Materials*. London: Springer.

PACHECO-TORGA, F. et al. (2013) *Eco-efficient Construction and Building Materials, Life Cycle Assessment (LCA), Eco-Labeling and Case Studies*. London: Springer.

Links

This unit links to the following related units:

Unit 2: Construction Technology

Unit 9: Principles of Heating Services Design & Installation

Unit 15: Principles of Refurbishment

Unit 16: Principles of Alternative Energy

Unit 35: Alternative Methods of Construction

Unit 46: Advanced Materials

Unit 4: Construction Practice & Management

Unit code	R/615/1390
Unit type	Core
Unit level	4
Credit value	15

Introduction

The aim of this unit is to develop and provide students with a holistic understanding of construction practice and management processes. Students will investigate and research the modern construction industry, both from the practical skills embedded within the industry through to its linkage with development on-site and the connection with construction management; including roles within the industry.

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

Students will also explore how health & safety has evolved within the industry, including how the major stakeholders, from companies to site operatives, have embedded health & safety into their preferred areas of development and careers. In addition, students will explore Building Information Modelling and how it fits into construction processes/sequences ranging from domestic to large-scale and design and build projects.

The knowledge from this unit will provide students with the understanding of modern construction and management; the skills, management of people and projects, and how health & safety have changed the perception of the construction industry.

Learning Outcomes

By the end of this unit students will be able to:

1. Describe the construction industry with reference to company structures and other activities.
2. Explain different types of construction companies in the market and their relationships within the tendering process.
3. Discuss the key stages in a construction project, and how Building Information Modelling informs the different stages.
4. Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of health & safety.

Essential Content

LO1 Describe the construction industry with reference to company structures and other activities

Understanding of the construction industry:

Historical development of the construction industry.

Professional and other institutes, including societies.

Links between professional, technical and skills professionals.

Contractor and head office structure.

Site structure and organisation.

Types of contractual work tendered by companies.

L02 Explain different types of construction companies in the market and their relationships within the tendering process

Company types:

Professional relationships between companies.

Contract tendering.

Tender process.

L03 Discuss the key stages in a construction project, and how Building Information Modelling informs the different stages

Master programmes and contract planning techniques.

The role of Building Information Modelling (BIM) on the construction.

Modern procurement methods within construction.

Sustainability.

L04 Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of health & safety

Key stakeholders in the construction process.

BIM and collaboration.

Health & safety within the construction industry:

Pre-construction regulations and legislation.

Site safety.

Learning Outcomes and Assessment Criteria

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

Pass	Merit	Distinction
L04 Analyse how the construction industry has developed suitable collaboration strategies in support of greater recognition of health & safety		D4 Evaluate the impact of health & safety legislation, how it has evolved the drivers for it, and its advantages or weaknesses within construction.
P9 Explain how health & safety has now become an integrated part of the construction process.	M4 Demonstrate how the construction industry has benefited through changes in health & safety legislation.	
P10 Describe the government legislation which has benchmarked health & safety within construction.		
P11 Discuss the role of collaboration and communication in ensuring safe working practices.		

Recommended Resources

Textbooks

GRIFFITH, A. and WATSON, P. (2003) *Construction management: Principles and practice*. Hampshire: Palgrave Macmillan.

HARRIS, F. and McCaffer, R. (2013) *Modern construction management*. Chichester: Wiley Blackwell.

KYMMELL, W. (2007) *Building information modeling: Planning and managing construction projects*. New York: McGraw Hill Professional.

OTTOSSON, H. (2012) *Practical project management for building and construction*. Boca Raton: CRC Press.

Websites

www.ciob.org.uk Chartered Institute of Building
(General Reference)

www.rics.org Royal Institute of Chartered Surveyors
(General Reference)

Links

This unit links to the following related units:

Unit 12: Financial Management & Business Practices in Construction

Unit 13: Tender & Procurement

Unit 23: Contracts & Management

Unit 24: Project Management

Unit 25: Management for Complex Building Projects

Unit 38: Personal Professional Development

Unit 45: Maintenance & Operations

Unit 47: Construction Data Management

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

Unit code D/615/1392
Unit level 4
Credit value 15

Introduction

To achieve successful projects in the built environment requires a range of different types of information: to describe the project, quantify the materials, provide clear instructions for assembly and erection, and to allow for accurate costing and management. Throughout the process of design, construction and post-occupancy management, information is critical.

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

Topics included in this unit are: construction drawing, detailing, Computer Aided Design (CAD), Building Information Modelling (BIM), schedules (door, window, hardware, etc.), specifications, schedules of work, bills of quantities and information distribution and collaboration.

Learning Outcomes

By the end of this unit students will be able to:

1. Evaluate different types of construction information in the context of diverse project types.
2. Develop construction drawings, details, schedules and specifications in support of a given construction project.
3. Interpret different types of construction information in order to explain a construction project.
4. Assess ways in which construction professionals collaborate in the production of construction information.

Essential Content

LO1 Evaluate different types of construction information in the context of diverse project types

Construction drawings.
Site plans.
Floor plans, roof plans, ceiling plans.
General arrangement.
Elevations.
Assembly drawings.
Component drawings/details.
Schedules.
Door schedules.
Window schedules.
Hardware schedules.
Specifications.

Performance specification.
Outline specification.
Full specification.
Specification templates/standards.

L02 Develop construction drawings, details, schedules and specifications in support of a given construction project

Computer Aided Design (CAD).
Templates.
Title blocks.
Annotation.
Building Information Modelling (BIM).
Specification software.
Bills of quantities.
Schedules of works.

L03 Interpret different types of construction information in order to explain a construction project

Reading construction drawings.
Information co-ordination.
Clash detection.
'Red-lining'.

L04 Assess ways in which construction professionals collaborate in the production of construction information

Project roles.
Information production.
Hierarchy of roles and information.
Project collaboration.
Document sharing/distribution.
Online/cloud-based collaboration.
Building Information Modelling (BIM).

Learning Outcomes and Assessment Criteria

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

Recommended Resources

Textbooks

CHING, F.D.K. (2014) *Building Construction Illustrated*. John Wiley & Sons.

CHUDLEY, R. (2016) *Building Construction Handbook*. Routledge.

Construction Specifications Institute (2011) *The CSI Construction Specifications Practice Guide*. John Wiley & Sons.

HUTH, M.W. (2009) *Understanding Construction Drawings*. Delmar Cengage.

KALIN, M. and WEYGANT, R.S. (2010) *Construction Specification Writing: Principles and Procedures*. John Wiley & Sons.

KUBBA, S. (2008) *Blueprint Reading: Construction Drawing for the Building Trade*. McGraw-Hill.

Websites

www.designingbuildings.co.uk

www.thenbs.com/knowledge

www.csinet.org

Designing Buildings Wiki (General Reference)

The NBS (General Reference)

CSI (General Reference)

Links

This unit links to the following related units:

Unit 1: Individual Project

Unit 14: Building Information Modelling

Unit 26: Advanced Construction Drawing & Detailing

Unit 36: Advanced Building Information Modelling

Unit 8: Mathematics for Construction

Unit code K/615/1394
Unit level 4
Credit value 15

Introduction

The aim of this unit is to develop students' skills in the mathematical principles and theories that underpin the civil engineering and building services curriculum. Students will be introduced to mathematical methods and statistical techniques in order to analyse and solve problems within a construction engineering context.

Topics included in this unit are: dimensional analysis, arithmetic and geometric progressions wave and vector functions, differential and integral calculus, binomial and normal distribution, sinusoidal waves, and trigonometric and hyperbolic identities, among other topics.

On successful completion of this unit students will be able to employ mathematical methods within a variety of contextualised examples, interpret data using statistical techniques, and use analytical and computational methods to evaluate and solve engineering construction problems. Therefore, they will also gain crucial employability skills such as critical thinking, problem solving, analysis, reasoning, and data interpretation.

Learning Outcomes

By the end of this unit students will be able to:

1. Identify the relevance of mathematical methods to a variety of conceptualised construction examples.
2. Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages.
3. Use analytical and computational methods for solving problems by relating sinusoidal wave and vector functions to their respective construction applications.
4. Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus.

Essential Content

LO1 Identify the relevance of mathematical methods to a variety of conceptualised construction examples

Mathematical concepts.
Dimensional analysis.
Arithmetic and geometric progressions.
Functions.
Exponential, logarithmic, circular and hyperbolic functions.

LO2 Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages

Summary of data.
Mean and standard deviation of grouped data.
Pearson's correlation coefficient.
Linear regression.
Probability theory.
Binomial and normal distribution.
Hypothesis testing for significance.

LO3 Use analytical and computational methods for solving problems by relating sinusoidal wave and vector functions to their respective construction applications

Sinusoidal waves.
Sine waves and applications.
Trigonometric and hyperbolic identities.
Vector functions.
Vector notation and properties.
Representing quantities in vector form.
Vectors in three dimensions.

LO4 Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus

Differential calculus.
Differentiation of functions.
Stationary points.
Rates of change.
Integral calculus.
Definite and indefinite integration.
Integrating to determine area and common functions.
Integration by substitution.
Exponential growth and decay.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p>L01 Identify the relevance of mathematical methods to a variety of conceptualised construction examples</p>		<p>L01 L02</p> <p>D1 Present statistical data in a method that can be understood by a non-technical audience.</p>
<p>P1 Apply dimensional analysis techniques to solve complex problems.</p> <p>P2 Generate answers from contextualised arithmetic and geometric progressions.</p> <p>P3 Determine the solutions of equations using exponential, trigonometric and hyperbolic functions.</p>	<p>M1 Apply dimensional analysis to derive equations.</p>	
<p>L02 Investigate applications of statistical techniques to interpret, organise and present data by using appropriate computer software packages</p>		
<p>P4 Summarise data by calculating mean and standard deviation, and simplify data into graphical form.</p> <p>P5 Calculate probabilities within both binomially distributed and normally distributed random variables.</p>	<p>M2 Interpret the results of a statistical hypothesis test conducted from a given scenario.</p>	
<p>L03 Use analytical and computational methods for solving problems by relating sinusoidal wave and vector functions to their respective construction applications</p>		
<p>P6 Solve construction problems relating to sinusoidal functions.</p> <p>P7 Represent construction quantities in vector form, and apply appropriate methodology to determine construction parameters.</p>	<p>M3 Apply compound angle identities to separate waves into distinct component waves.</p>	
		<p>D2 Model the combination of sine waves graphically and analyse the variation between graphical and analytical methods.</p>

Pass	Merit	Distinction
LO4 Illustrate the wide-ranging uses of calculus within different construction disciplines by solving problems of differential and integral calculus		D3 Analyse maxima and minima of increasing and decreasing functions using higher order derivatives.
P8 Determine rates of change for algebraic, logarithmic and circular functions. P9 Use integral calculus to solve practical problems relating to engineering.	M4 Formulate predictions of exponential growth and decay models using integration methods.	

Recommended Resources

Textbooks

SINGH, K. (2011) *Engineering Mathematics Through Applications*. 2nd Ed. Basingstoke: Palgrave Macmillan.

STROUD, K. A. and BOOTH, D.J. (2013) *Engineering Mathematics*. 7th Ed. Basingstoke: Palgrave Macmillan.

Websites

mathcentre.ac.uk Mathcentre (Training/Tutorials)
 mathtutor.ac.uk Mathtutor (Training/Tutorials)

Links

This unit links to the following related units:

Unit 9: Principles of Heating Services Design & Installation
Unit 10: Principles of Ventilation & Air Conditioning Design & Installation
Unit 17: Principles of Public Health Engineering
Unit 18: Civil Engineering Technology
Unit 19: Principles of Electrical Design & Installation
Unit 28: Further Mathematics for Construction
Unit 30: Advanced Structural Design
Unit 31: Advanced Heating, Ventilation & Air Conditioning Design & Installation
Unit 33: Advanced Electrical Design & Installation
Unit 43: Hydraulics

Unit 20: Principles of Structural Design

Unit code	R/615/1406
Unit type	Core
Unit Level	4
Credit value	15

Introduction

Buildings, bridges, roads, and many other types of man-made structures are critical to the economic and social well-being of our societies. We rely upon these structures to provide us with suitable spaces and infrastructure to support our daily lives. This unit explores the fundamental principles of structural design, codes of practice and standards required to construct safe, effective static civil engineering structures commonly used in today's infrastructure projects.

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

On successful completion of this unit students will be able to determine and analyse forces within fixed structures and understand the fundamental concepts of structural design.

Learning Outcomes

By the end of this unit students will be able to:

1. Calculate bending moments and shear forces for simply supported steel and concrete beams.
2. Determine deflection for simply supported steel beams.
3. Calculate the axial load carrying capacity of steel and reinforced concrete columns.
4. Explore design methods for steel, reinforced concrete beams and columns.

Essential content

LO1 Calculate bending moments and shear forces for simply supported steel and concrete beams

Loading:

Dead loads.

Live loads.

Wind loads.

Point loads.

Uniformly distributed loads.

Elasticity and plasticity of common construction materials:

Factors of safety.

Building regulations.

Health and safety regulations.

Bending moments:

Bending moment diagrams.

Shear forces:
Shear force diagrams.

LO2 Determine deflection for simply supported steel beams

Deflection in supported beams with point loads.
Deflection in supported beams with uniformly distributed loading.

LO3 Calculate the axial load carrying capacity of steel and reinforced concrete columns

Axial loading:
Steel columns.
Reinforced concrete columns.
Foundations.

Slenderness ratio.
Effective length.
Material properties.
Corrosion resistance.
Weathering.

LO4 Explore design methods for steel, reinforced concrete beams and columns

Limit state design.

Steel:
Beam design and selection.
Column design and selection.

Reinforced concrete:
Beam design and selection.
Column design and selection.

Building Information Modelling for structures.

Learning Outcomes and Assessment Criteria

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

Pass	Merit	Distinction
LO4 Explore design methods for steel, reinforced concrete beams and columns		D3 Assess the use of Building Information Modelling in the production of accurate structural design information and the collaborative environment of structural design.
P7 Develop a design solution, including beam design and column design, for a given scenario. P8 Produce drawings and specifications in support of a structural design solution.	M4 Evaluate the use of an alternative material in achieving a design solution, discussing the benefits or challenges associated.	

Recommended resources

Textbooks

ANTHONY, A. et al (2007) *Reynolds's Reinforced Concrete Designer's Handbook*. 11th Ed. Taylor & Francis.

DURKA, F. et al (2002) *Structural Mechanics: Loads, Analysis, Design and Materials*. 6th Ed. Prentice Hall.

FIONA, C. (2008) *Structural Engineer's Pocket Book*. 2nd Ed. Butterworth-Heinemann.

HULSE, R. and CAIN, J. (2000) *Structural Mechanics*. 2nd Rev Ed. Palgrave Macmillan.

MCKENZIE, W. (2003) *Design of Structural Elements*. Palgrave Macmillan.

MOSLEY, H. (2007) *Reinforced Concrete Design*. 6th Rev Ed. Palgrave.

OZELTON, E. (2006) *Timber Designers' Manual*. Wiley-Blackwell.

SEWARD, D. (2003) *Understanding Structures: Analysis, Materials, Design*. 3rd Rev Ed. Palgrave Macmillan.

SMITH, P. (2001) *An Introduction to Structural Mechanics*. Palgrave Macmillan.

Steel Construction Institute (2005) *Steel Design Manual*. 6th Ed. Wiley-Blackwell.

Websites

www.ice.org.uk Institution of Civil Engineers (General Reference)

www.istructe.org The Institution of Structural Engineers (General Reference)

www.iabse.org International Association for Bridge and Structural Engineering (General Reference)

www.cices.org Chartered Institution of Civil Engineering Surveyors (General Reference)

Links

This unit links to the following related units:

Unit 2: Construction Technology

Unit 3: Science & Materials

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

Unit 8: Mathematics for Construction

Unit 14: Building Information Modelling

Unit 18 Civil Engineering Technology

Unit 26: Advanced Construction Drawing & Detailing

Unit 28: Further Mathematics for Construction

Unit 29: Geotechnics & Soil Mechanics

Unit 35: Alternative Methods of Construction

Unit 36: Advanced Building Information Modelling

Unit 42: Highway Engineering

Unit 46: Advanced Materials

Unit 7: Surveying, Measuring & Setting Out

Unit code H/615/1393
Unit level 4
Credit value 15

Introduction

Infrastructure and new buildings are essential requirements of modern life. In both construction and civil engineering there is a need to conduct initial surveys to assist the design team in establishing a clearly defined starting point. Once designed, the priority becomes to 'set out' the structures to the required accuracy to facilitate the construction process. Finally, 'as built' surveys are necessary to assist future maintenance and improvements to the built asset.

This unit explores the techniques used to set up controls and conduct topographic surveys. It also covers communication of results and methods of setting out structures.

On successful completion of this unit students will be able to set up and assess the accuracy of control points. From these or any other control points the students will be able to complete a topographic survey or set out a structure. The students will also be able analyse errors in setting out and surveying.

Learning Outcomes

By the end of this unit students will be able to:

1. Undertake a survey to establish a station network for horizontal and vertical control.
2. Explain the process of undertaking a topographic survey.
3. Apply industry standard techniques in the production, transferring and staking out of co-ordinates of multiple construction elements.
4. Prepare a report on the causes of errors and techniques to improve accuracy, including the use of digital data.

Essential Content

LO1 Undertake a survey to establish a station network for horizontal and vertical control

Description of types of control points.

Primary controls, first and second order.

Secondary control.

Different methods of marking control points.

The use of local, national and grid control available.

Conducting a closed traverse.

Carrying out a full closed traverse survey for horizontal and vertical controls.

Methods for checking accuracy of the traverse.

Matching the control station accuracy to national standards or recommendations.

Calculations to obtain corrected co-ordinates.

LO2 Explain the process of undertaking a topographic survey

Purpose of a topographic survey.

Links to initial control.
Techniques to communicate a completed survey.
Cut and fill information obtained from a survey.
Methods of completing a topographic survey.
Equipment to be used to capture topographic details.
Use of free station and GPS to complete the survey.
Coding systems for features to be surveyed.
Data transfer techniques.

LO3 Apply industry standard techniques in the production, transferring and staking out of co-ordinates of multiple construction elements

Examples of construction elements.
Building outlines, centre lines of structural elements, boundary locations from national co-ordinates, road centre lines, drainage and hard landscape features.

Setting out techniques.
Holistic view of setting from the whole to the part.
Use of free station, reference lines, stake out, tie distances within a total station program.
Techniques to obtain setting out data, including data transfer.
Process of setting out structures and offsetting lines of structural elements.
Horizontal and vertical control of construction, both initially and as the work commences.

LO4 Prepare a report on the causes of errors and techniques to improve accuracy, including the use of digital data

Errors in surveying and setting out.
Instrumentation error: prism constants, reflector heights, atmospheric influences, calibration certification, free station errors, discrete setting out.
Human errors: alignment of levelling staffs and hand- or tripod-mounted prisms, physical setting out constraints.

Improvement of accuracy:
Use of technology to provide checking methods.
Testing procedures for instrumentation to be used in setting out and surveying.
Comparing accuracy of set out element to nationally recognised standards.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p>LO1 Undertake a survey to establish a station network for horizontal and vertical control</p>		<p>LO1 LO2</p> <p>D1 Assess the accuracy of a network in the production of a topographic survey.</p>
<p>P1 Describe the types of control networks that are available for surveying, including examples of local and national stations.</p> <p>P2 Carry-out a closed traverse survey of a network, including at least five stations.</p> <p>P3 Calculate corrected co-ordinates and heights for the stations and explain the stages used.</p>	<p>M1 Calculate and compare the accuracy achieved in a closed traverse survey.</p>	
<p>LO2 Explain the process of undertaking a topographic survey</p>		
<p>P4 Explain the process of conducting a topographic survey for a given plot of land, including initial control.</p> <p>P5 Describe, with examples, common coding systems and data exchange processes, including communicating final outcomes.</p>	<p>M2 Review the content of a topographic survey, including analysis of its suitability to assist the design team in completing the design.</p>	
<p>LO3 Apply industry standard techniques in the production, transferring and staking out of co-ordinates of multiple construction elements</p>		<p>D2 Analyse both the accuracy achieved and the techniques used during the practical exercise.</p>
<p>P6 Extract and transfer the required data from a given project to a total station in order to allow setting out to commence.</p> <p>P7 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>M3 Analyse the accuracy achieved from a setting out operation from tie distances recorded, total station stored data and another means.</p>	

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

Recommended Resources

Textbooks

IRVINE, W. and MACLENNAN, F. (2005) *Surveying for Construction*. 5th Ed. London: McGraw-Hill.

SCHOFIELD, W. and BREACH, M. (2007) *Engineering Surveying*. 6th Ed. Oxford: Elsevier.

SADGROVE, B.M. (2007) *Setting Out Procedures for the Modern Built Environment*. London: Ciria.

UREN, J. and PRICE, W. (2010) *Surveying for Engineers*. 5th Ed. Basingstoke: Palgrave Macmillan.

Websites

ice.org.uk Institution of Civil Engineers (General Reference)
tsa-uk.org.uk The Survey Association (General Reference)

Links

This unit links to the following related units:

Unit 11: Measurement & Estimating

Unit 13: Tender & Procurement

Unit 23: Contracts & Management

Unit 41: Surveying for Conservation, Renovation & Refurbishment

Unit 44: Advanced Surveying & Measurement

Unit 18: Civil Engineering Technology

Unit code J/615/1404
Unit level 4
Credit value 15

Introduction

This unit explores the role of professional civil engineers, their essential involvement in the construction and maintenance of infrastructure, and the key technologies they apply. The technologies and processes of civil engineering, in the development of highways, bridges, drainage systems, substructure and superstructure, are crucial to support contemporary societies.

Topics included in this unit are: earthwork activities, temporary and permanent dewatering procedures, methods and techniques used to create substructures, highways and superstructures and the common hazards, technical problems and solutions associated with modern civil engineering activities.

On successful completion of this unit students will be able to describe, analyse and evaluate modern civil engineering procedures, apply this skill and knowledge to the design of infrastructure and produce solutions to address hazards and problems encountered in civil engineering projects.

Learning Outcomes

By the end of this unit students will be able to:

1. Explain the methods and techniques used in civil engineering for earthworks and substructures.
2. Present a site safety plan, risk assessment and method statement for a given civil engineering activity.
3. Evaluate a given civil engineering problem and propose a solution.
4. Prepare a design proposal for a new infrastructure project.

Essential Content

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

Earthworks activities, use and specification of earthmoving equipment.

Formation of cuttings and embankments:

Groundwater problems and techniques used to deal with issues of ground and slope stability.

Temporary and permanent dewatering techniques.

Techniques used in deep excavations and trenching works.

Methods and techniques used to create complex foundations.

Methods and techniques used in piling works.

Methods and techniques used in drainage works.

Methods and techniques used in culvert construction.

Methods and techniques used in underpasses and utilities.

L02 Present a site safety plan, risk assessment and method statement report for a given civil engineering activity

Health & safety legislation and codes of practice relative to civil engineering site activities, hazards, risks and safety arrangements for excavations:

Hazards, risks and safety arrangements for working in confined spaces.

Hazards, risks and safety arrangements for working on structures.

Hazards, risks and safety arrangements for working within temporary works on highways.

Roles and responsibilities of all parties in civil engineering projects.

Site safety plans.

L03 Evaluate a given civil engineering problem and propose a solution

Civil engineering environmental contexts.

Civil engineering quality contexts.

Civil engineering geotechnical contexts.

Civil engineering economic contexts.

L04 Prepare a design proposal for a new infrastructure project

Methods and techniques used to create bridges and the different specifications of bridges:

Flexible highway construction foundation criteria and related geotechnical parameters.

Methods and techniques used to create flexible highways.

Methods and techniques used in highway link and junction design.

Methods and techniques used in flexible pavement design.

Learning Outcomes and Assessment Criteria

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

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

Recommended Resources

Textbooks

CHUDLEY, R. and GREENO, R. (2012) *Advanced Construction Technology*. 5th Ed. Pearson.

CHUDLEY, R. and GREENO, R. (2014) *Building Construction Handbook*. 10th Ed. Butterworth-Heinemann.

MANLEY, S., CHARTERS, M., FRANCIS, C., TOPLISS, S. and DOYLE, M. (2008) *Construction and the Built Environment*. Pearson.

ROGERS, M. and ENRIGHT, B. (2016) *Highway Engineering*. 3rd Ed. Wiley and Sons.

Websites

www.standardsforhighways.co.uk

www.ice.org.uk

www.icevirtuallibrary.com

Standards for Highways (General Reference)
Institution of Civil Engineers (General Reference)
Institution of Civil Engineers "Virtual Library"
(General Reference)

Links

This unit links to the following related units:

Unit 2: Construction Technology

Unit 3: Science & Materials

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

Unit 8: Mathematics for Construction

Unit 14: Building Information Modelling

Unit 26: Advanced Construction Drawing & Detailing

Unit 27: Construction Technology for Complex Building Projects
Unit 30: Advanced Structural Design
Unit 36: Advanced Building Information Modelling
Unit 42: Highway Engineering

Unit 21: Site Supervision & Operations

Unit code Y/615/1407
Unit Level 4
Credit value 15

Introduction

The construction of buildings and infrastructure involves many different types of work and many different people. The skills required to successfully manage the diverse groups of people on a building site, and to monitor and assess their work, is critical to both the success of the project and to ensure the safety of those working.

Through this unit students will develop the skills and techniques necessary to manage the people and processes of a building site, ensuring the quality of work, safe working practices and the interactions of different 'trades'.

Topics covered in this unit include: evaluating construction information, monitoring quality, identifying and notifying of defects, sustainable methods of construction, site safety regulations, health & safety regulations, people management, performance management, site meetings, contractor and sub-contractor relations.

Learning Outcomes

By the end of this unit students will be able to:

1. Evaluate construction information to determine quality requirements.
2. Prepare a report on defects and recommended remedial actions.
3. Assess a pre-construction health & safety plan for a given construction project, in relation to local and national regulations.
4. Discuss methods for evaluating and improving the performance of site staff.

Essential content

LO1 Evaluate construction information to determine quality requirements

Construction information:

Construction drawings.
Specifications.
Schedules.
Building Information Modelling.

Statutory documents related to quality:

Building regulations.
Health & safety regulations.

LO2 Prepare a report on defects and recommended remedial actions

Site visits and evaluation:

Patent defects.
Latent defects.
'Walking the site'.
Identifying defects.
Recording defects.

Notifying defects.

On-site testing/off-site testing:

Prototypes.

Mock-ups.

Testing facilities.

Quality certification systems.

Quality control responsibilities:

Architect.

Civil engineer.

Clerk of works.

Contractors/sub-contractors.

Site staff.

LO3 **Assess a pre-construction health & safety plan for a given construction project, in relation to local and national regulations**

Construction design management:

Client responsibilities.

Professional responsibilities.

Information recording and sharing.

Statutory health and safety requirements:

Site safety monitoring.

Responsibilities.

Notifications.

Risk assessment and management:

LO4 **Discuss methods for evaluating and improving the performance of site staff**

Working relationships:

Effective communication.

Motivation.

Managing conflict.

Equality and diversity.

Performance monitoring and evaluation:

Supervision and supervisors.

Target setting.

Review.

Self-evaluation.

Supervisor evaluation.

Peer evaluation.

Training and development needs.

Site manager responsibilities:

Leadership techniques

Identifying staff training needs

Training and development planning

Continuing Professional Development

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Evaluate construction information to determine quality requirements		LO1 LO2 D1 Review construction information and schedules of defects to ascertain patent defects and the implication for defects liability.
P1 Define quality requirements for a given project through the review of drawings, specifications and schedules. P2 Explore the relationship between project quality requirements with statutory requirements.	M1 Evaluate the impact of potential changes in project quality requirements that are necessary to meet statutory requirements.	
LO2 Prepare a report on defects and recommended remedial actions		
P3 Identify defects for a given construction project and produce a schedule of defects. P4 Explore remedial actions necessary to address identified defects.	M2 Discuss the difference between patent and latent defects and their associated implications for remedial actions.	
LO3 Assess a pre-construction health & safety plan for a given construction project, in relation to local and national regulations		D2 Give examples of methods for promoting a positive approach to health & safety for a construction team.
P5 Discuss the importance of construction design management for ensuring site safety. P6 Discuss local and national requirements for health & safety in relation to construction projects.	M3 Evaluate the impact of health & safety violations on construction projects.	

Pass	Merit	Distinction
LO4 Discuss methods for evaluating and improving the performance of site staff		D3 Analyse the relationship between performance management and health & safety legislation.
P7 Describe the methods for evaluating the performance of team members. P8 Recommend training and development strategies to improve performance.	M4 Evaluate the relationship between equality and diversity and performance management in the construction industry.	

Recommended resources

Textbooks

BARBER, J. and INSTITUTION OF CIVIL ENGINEERS (Great Britain) (2002) *Health & safety in construction: guidance for construction professionals*. Thomas Telford.

CHARTERED INSTITUTE OF BUILDING (2014) *Code of Practice for Project Management for Construction and Development*. 5th Ed. London: Wiley-Blackwell.

COLES, D., BAILEY, G. and CALVERT, R. E. (2012) *Introduction to Building Management*. London: Routledge.

COOKE, B. and WILLIAMS, P. (2009) *Construction planning, programming and control*. Wiley-Blackwell.

DAINTY, A. and LOOSEMORE, M. (2012) *Human Resource Management in Construction: Critical Perspectives*. 2nd Ed. London: Routledge.

FORSTER, G. (1986) *Building organisations, and procedure*. Longman Scientific & Technical.

HARRIS, F., MCCAFFER, R. and EDUM-FOTWE, F. (2013). *Modern construction management*. Wiley-Blackwell.

HUGHES, P., PHILLIP W. and FERRETT, E. (n.d.) *Introduction to health & safety in construction: for the NEBOSH national certificate in construction health & safety*.

Websites

www.ciob.org	Chartered Institute of Building
www.pmi.org	Project Management Institute
www.cipd.co.uk	Chartered Institute of Personnel and Development
www.ice.org.uk	Institutions of Civil Engineers

Links

This unit links to the following related units:

Unit 4: Construction Practice & Management

Unit 5: Legal & Statutory Responsibilities in Construction

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

Unit 12: Financial Management & Business Practices in Construction

Unit 13: Tender & Procurement
Unit 14: Building Information Modelling
Unit 23: Contracts & Management
Unit 24: Project Management
Unit 45: Maintenance & Operations