Unit title	Construction Technology
Guided learning hours	60
Number of lessons	30
Duration of lessons	2 hours

Links to other units

- Unit 2: Construction Design
- Unit 4: Safe Working Practices
- Unit 7: Graphical Detailing
- Unit 12: Building Surveying in Construction
- Unit 13: Site Engineering for Construction
- Unit 14: Low Temperature Hot Water Systems in Building Services
- Unit 15: Measurement Techniques in Construction
- Unit 16: Provision of Primary Services in Buildings

Key to lesson types			
AW	Assignment writing	**RS**	Revision session
GS	Guest speaker	**V**	Visit
IS	Independent study	**GW**	Work experience

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
1	Learning aims A, B, C and D		• **Tutor presentation:** emphasise that this is a mandatory unit across all qualification sizes and give an overview of the unit covering: ○ key topics of the unit content ○ nature of the learning aims ○ teaching and learning activities ○ type of assessment and the use of a Pearson Set Assignment.	Specification – learning aims, unit content and assessment criteria Assignment brief examples in terms of task setting and expectations of the quality of work
Learning aim A: Understand common forms of low-rise construction				
1	**A1:** Forms of low-rise construction	IS	• **Lead-in:** introduce the topic by showing some images/illustrations demonstrating the concept of a frame. • **Tutor-led discussion:** engage learners by asking questions about the advantages of using this construction form. Summarise key points and add as necessary. • **Tutor presentation:** skeletal and portal frame (steel, reinforced concrete), and timber frame construction. Use the suggested video resources and/or other web-based or DVD resources as appropriate. • **Tutor-led discussion:** build on the previous discussion and draw attention to suitability of such framed structures. • **Q&A:** learners work in pairs on a knowledge quiz. Use this as a learning check. Share the answers and ask learners to do self-assessment of their work. • **Plenary:** answer any questions learners have and introduce the next topic.	Load bearing and frame structure on YouTube (portal frame construction): 'Steel frame construction 3D animation' Timber frame construction on YouTube: 'Frame Wise build timber frame house at Timber Expo' Knowledge quiz

2	**A1:** Forms of low-rise construction	GW	• **Tutor-led discussion:** draw on any experience learners have, such as being on a building site or witnessing house construction/extension being carried out. Draw on this experience to introduce the topic. • **Tutor-led discussion:** engage learners by asking questions about the advantages of using traditional construction forms. Summarise key points and add as necessary. • **Tutor presentation:** explain the *in situ* methods – especially walls, floors and roofs – in terms of how these are connected. Use the suggested video resources and/or other web-based or DVD resources as appropriate. • **Group activity:** working in small groups, task learners to justify the selection of construction forms suitable for traditional and framed construction. Invite groups to present their findings. • **Class discussion:** based on the result of group activity, initiate a class discussion about the suitability of construction forms and associated materials. • **Plenary:** draw on the key points. Answer any questions learners have and introduce the next topic.	Solid brick load bearing construction sequence on YouTube: 'Solid brick load-bearing construction sequence' Cavity wall on YouTube: 'Brick and block cavity wall' Group activity brief
3	**A1:** Forms of low-rise construction	GW	• **Tutor presentation:** introduce the concept of modular construction. A good analogy to follow is a Lego game where you could relate to various types/sizes of blocks to modules in a building. Examples can be found online of companies such as Laing O'Rourke's Design for Manufacture and Assembly (DfMA) process and Legal & General's new facility that produces modular components using cross-laminated timber technology.	Modular construction resources on YouTube: 'What are the advantages of modular construction?' on YouTube Modular project on YouTube: 'Yorkon

			• **Tutor-led discussion:** engage learners by asking questions about the advantages of using this construction form. Summarise key points and add as necessary. • **Tutor presentation:** explain various types of modules, including non-load bearing modules. Use the suggested video resources and/or other web-based or DVD resources as appropriate. • **Group activity:** working in small groups, learners justify the selection of construction forms suitable for modular construction before presenting their findings to the class. • **Class discussion:** based on the result of group activity, initiate a class discussion about the suitability of construction forms and associated materials. • **Plenary:** draw on the key points. Answer any questions learners have and introduce the next topic.	modular construction – the UK's largest modular health contract' Group activity brief
Learning aim B: Examine foundation design and construction				
4	**B1:** Subsoil investigation	GW	• **Tutor presentation:** introduce the topic by emphasising that the purpose is to understand data and information that is to be used for foundation design. Explain concepts such as bearing capacity and subsoil classification to help learners understand their significance. • **Tutor-led discussion:** give some examples of investigation data for learners to engage with and develop their understanding of the information and its use. Draw on the key points and summarise. • **Tutor-led discussion:** give an overview of various site investigation methods and ask learners to comment on their possible advantages and disadvantages. Draw on the key	Site investigation resources on the 'rsa-geotechnics' website. Site investigation video (YouTube): '7:1 Site Investigation **–** Drilling, sampling and profiling'

			points and summarise. Use the suggested or any other alternative resources.	
5	**B1:** Subsoil investigation	GW	• **Tutor presentation:** give a clear brief to learners that they will be carrying out a desk study and a walkover survey of, e.g., the campus grounds. Give learners some help sheets, such as checklists and information sources. • **Paired activity:** learners carry out desk study followed by a walkover survey. • **Tutor-led discussion:** ask learners to share their results. Comment on any variations and summarise.	IT resources Worksheets Appropriate personal protective equipment (PPE)
6	**B2:** Subsoil improvement	GW	• **Tutor-led discussion:** introduce the techniques to improve the bearing capacity of the ground. Engage learners by asking about the possible ways to do so. Give a detailed overview of one of the techniques by using the suggested resource. • **Group activity:** ask learners to carry out research about the possible methods of subsoil improvement and present their findings to the class. • **Plenary:** draw on the presentations and summarise.	Vibro replacement video on YouTube: 'Vibro replacement (stone columns) – Bottom Feed' IT resources Group activity brief
7	**B3:** Design principles • Factors used during design to minimise settlement • Design to minimise other movement	GW	• **Lead-in:** recap and establish prior knowledge through a Q&A session about the relationship between building load and ground bearing capacity. • **Tutor-led discussion:** introduce the concept of the foundation footprint and the intention to transfer loads to a suitable bearing strata. Engage the learners through Q&A. • **Group activity:** ask learners to carry out research and give an example of one of the following: ○ soil shrinkage	IT resources Group activity brief

			○ ground heave ○ differential settlement ○ effects of tree growth and tree removal. You may allocate topics to groups if appropriate. Learners will present their findings, which you will summarise at the end of lesson. ● **Plenary:** draw on the presentations and summarise.	
8	**B3:** Design principles	GS	● **Lead-in:** introduce the guest speaker and prepare learners to ask questions. ● **Guest speaker:** this could be, e.g., a geotechnical design engineer, a structural engineer or a technical staff member working at the local council. The guest speaker should be able to share with learners some examples of design principles currently in practice. ● **Q&A:** give learners the opportunity to ask questions.	Guest speaker
9	**B3:** Design principles	GW	● **Tutor presentation:** introduce building regulations, their use and their significance. ● **Group activity:** give a range of activity briefs, where learners could use the building regulations to determine parameters such as width and thickness of foundations and overlaps. ● **Plenary:** review the briefs and activities, summarising key points.	Group activity brief
10	**B4:** Types of foundation	GW	● **Tutor presentation:** introduce the topic by using illustrations, sketches, animations or video resources. Discuss the suitability of each foundation type: strip, trench fill, raft and pad.	Types of foundation on YouTube: 'Raft foundation construction method'

			• **Individual activity:** give learners foundation sketches and ask them to redraw one of these, examining its characteristics and the various elements. • **Group activity:** split learners into groups so that each member has a similar foundation type, to discuss: details of foundation, materials used, potential advantages and disadvantages, and factors affecting choice of each foundation type. • **Group activity:** learners present their findings. • **Plenary:** review activity and summarise the key points.	
11	**B4:** Types of foundation	GW	• **Tutor presentation:** introduce the pile foundations by using illustrations, sketches, animations or video resources, discussing the suitability of each type. • **Individual activity:** give learners foundation sketches and ask them to redraw one of these, examining its characteristics and the various elements. • **Group activity:** put learners in groups so that each member has a similar foundation type. Ask learners to discuss among their group members details of foundation, materials used, potential advantages and disadvantages, and factors affecting choice of each foundation type. Learners will present their findings, which you will use to summarise the key points.	Pile foundations on Designing Buildings Wiki website Pile foundation video on YouTube: 'Pile foundation' Pile installation video on YouTube: 'Basic pile installation'
Learning aim C: Examine superstructure design and construction				
12	**C1:** Walls • External cavity walls	V	• **Group activity:** site visit, ideally showing both substructure and superstructure as well as external works. Coordinate with the site staff to ascertain: o health and safety requirements	Appropriate PPE Cavity wall YouTube: 'Brick and block cavity wall'

	• Solid walls with rainscreen cladding		○ type of project ○ construction stage ○ extent to which site staff could engage (project presentation, access to drawings, site investigation data, design data). **Alternatively (where a site visit is not possible):** • **Lead-in:** recap on traditional forms of construction and apply learning checks to gauge the understanding of construction methods. • **Tutor-led discussion:** engage learners in a discussion about the performance requirements of cavity and solid walls. Draw on key points and summarise. • **Group activity:** allocate each group a topic related to external cavity wall and solid walls to conduct research. Ask all groups to consider stability and detailing. Allocate topics from: construction methods and techniques; materials used; external finishes; performance requirements; advantages and disadvantages; and rainscreen cladding. • **Plenary:** groups share their findings with the whole class. Draw on key points and summarise.	Rainscreen cladding on GreenSpec website – search 'Housing retrofit / Rainscreen cladding'
13	**C1:** Walls	V	• **Group activity:** site visit (as outlined in lesson 12 above). **Alternatively (where a site visit is not possible):** • **Lead-in:** recap on traditional forms of construction and apply learning checks to gauge the understanding of construction methods. • **Tutor-led discussion:** engage learners in discussion about performance requirements of internal walls and partitions. Draw on key points and summarise.	Appropriate PPE Internal walls on YouTube: 'How to build a partition wall beginner's guide'

			• **Group activity:** allocate each group a topic related to internal walls and partitions to conduct research. Ask all groups to consider stability and detailing. Allocate topics from: construction methods and techniques; materials used; external finishes; and performance requirements. Allocate types of partition walls from the following: o blockwork partitions o timber stud partitions o metal stud partitions o demountable partitions. • **Plenary:** the groups will share their findings with their peers. Draw on key points and summarise.	
14	**C1:** Walls	V	• **Group activity:** site visit (as outlined in lesson 13 above). **Alternatively (where a site visit is not possible):** • **Lead-in:** recap on framed construction and apply learning checks to gauge the understanding of construction methods. • **Tutor-led discussion:** engage learners in discussion about performance requirements of prefabricated timber frame construction for walls. Draw on key points and summarise. • **Group activity:** allocate each group a topic related to timber frame construction to conduct research. Ask all groups should consider stability and detailing. Allocate topics from: construction methods and techniques; materials used; external finishes; and performance requirements covering internal and external walls as well as cladding requirements. • **Plenary:** invite groups to share their findings with the class. Draw on key points and summarise.	Appropriate PPE Timber frame construction on YouTube: 'Frame Wise build timber frame house at Timber Expo'

15	**C1:** Walls	V	• **Group activity:** site visit (as outlined in lesson 14 above). **Alternatively (where a site visit is not possible):** • **Lead-in:** recap on the topics covered so far and apply learning checks to gauge the understanding of construction methods. • **Tutor-led discussion:** engage learners in discussion about performance requirements of various openings. Draw on key points and summarise. • **Group activity:** allocate each group a topic related to openings in walls to conduct research. Ask all groups to consider stability and detailing. Allocate topics from: construction methods and techniques; materials used; external finishes; and performance requirements covering: o head detailing, including methods of supporting the wall above the opening o jamb detailing o sill and threshold detailing o windows o doors. • **Plenary:** invite groups to share their findings with the class. Draw on key points and summarise.	Appropriate PPE Providing lintels on YouTube: 'How to put steel RSJ lintels into a supporting wall' Sill detailing on YouTube: 'Bottom sill flashing – slab to bottom plate connection'
16	**C2:** Floors • Ground floors	GW	• **Group activity:** give learners detailed drawings of various types of ground floors. Ask them to study these drawings, conduct research and share their findings with their peers. Each group will be allocated a floor type. Their work will include: construction methods and techniques; materials used; support; detailing; finishes; performance requirements; advantages and disadvantages.	Beam and block floor on YouTube: 'How to install insulation block and beam floors, TETRiS eco-friendly thermal flooring system'

			• **Plenary:** draw on the key points and summarise.	Suspended floor on YouTube: 'IWS fast timber floor'
17	**C2:** Floors	GW	• **Lead-in:** recap the previous session and apply learning checks to gauge understanding of the types and performance requirements of floors. • **Group activity:** give learners detailed drawings of various types of intermediate floors and stairs. Ask them to study these drawings, conduct research and share their findings with the class. Each group will be allocated an element. Their work will include: construction methods and techniques; materials used; support; detailing; finishes; performance requirements; advantages and disadvantages. • **Plenary:** draw on the key points and summarise.	Precast concrete stairs on YouTube: 'Precast concrete stairs' Platform flooring system on YouTube: 'Platform flooring system'
18	**C3:** Roofs	GW	• **Group activity:** give learners detailed drawings of pitched roofs, including mono pitch, double pitch, gable ended and hipped, in trussed rafter construction as well as traditional timber roofing. Allocate each group one type of roof. Ask learners to study these drawings, conduct research and share their findings with the class. Their work will include: construction methods and techniques; materials and components used; support, (including bracing and lateral restraint); detailing (at eaves, verge, abutments and ridge); finishes; performance requirements; advantages and disadvantages. • **Plenary:** drawn on the key points and summarise.	YouTube: 'Building a pitched roof'
19	**C3:** Roofs	GW	• **Lead-in:** recap the types and functions of roofs and apply learning checks to gauge the understanding.	YouTube: 'Warm flat roof construction explained'

			• **Group activity:** give learners detailed drawings of flat roofs, including warm and cold deck roofs. Allocate each group one type of roof. Ask learners to study these drawings, conduct research and share their findings with the class. Their work will include: construction methods and techniques; materials and components used; support (including bracing and lateral restraint); detailing (at eaves, verge, abutments and ridge); finishes; performance requirements; advantages and disadvantages as well as methods of achieving required falls. • **Plenary:** drawn on the key points and summarise.	YouTube: 'Cold flat roof construction explained'
20	**C4:** Internal finishes	GW	• **Tutor presentation:** introduce various types of wall finishes by drawing learners' attention to their experience of living in, and using, various spaces. Explain the use of various materials and their properties making them suitable for a specific use. Make use of suggested web resources. • **Group activity:** ask learners to go around the campus buildings and make a note of various wall finishes used. Ask learners to reflect on their learning so far as well as carry out additional research to be able to present application, characteristics, properties, advantages and disadvantages of each wall finish encountered during the visit. • **Plenary:** draw on the key points and summarise.	YouTube: '5 different types of wall finishes for interior design' YouTube: 'How to plaster a wall diy'
21	**C4:** Internal finishes	GW	• **Tutor presentation:** introduce various types of ceiling and floor finishes by drawing learners' attention to their experience of living in, and using, various spaces. Explain the use of various materials and their properties making them suitable for a specific use. Make use of suggested web resources. • **Group activity:** ask learners to go around the campus buildings and make a note of various ceiling and floor finishes	Suspended ceilings in British-Gypsum.com; search 'CasoLine quick-lock grid' YouTube: 'How to install laminate flooring'

			used. Ask learners to reflect on the learning so far as well as carry out additional research to be able to present application, characteristics, properties, advantages and disadvantages of each finish encountered during the visit. • **Plenary:** draw on the key points and summarise.	
Learning aim D: Examine external works associated with construction projects				
22	**D1:** Foul and surface water drainage	GW	• **Tutor presentation:** introduce the topic explaining the difference between separate and combined systems as well as advantages and disadvantages of each system. Cover principles such as layout, falls and access, to help learners understand their significance. • **Group activity:** give some examples of combined and separate systems, including layout and component drawings. Ask learners to engage in a discussion with their peers and comment on layout, falls, access, advantages and disadvantages of the given detail. • **Plenary:** drawn on the key points and summarise.	YouTube: 'Sewer system animation for public works – MMSD' YouTube: 'Planning your foul water and below ground drainage system – OsmaDrain'
23	**D2:** Utility services	GS	• **Lead-in:** introduce the guest speaker and prepare learners to ask questions. • **Guest speaker:** invite either a services engineer or someone from a utility company background to present to class. Ideally they should cover some real-world examples of utility services in terms of their layout, depth, colour coding of ducts, positioning, and building entry of water, gas, electricity and telecommunications. • **Q&A:** give learners the opportunity to ask questions.	Guest speaker

24	**D3:** Roads and footpaths	V	• **Group activity:** site visit (as outlined in lesson 15 above). **Alternatively (where a site visit is not possible):** • **Tutor presentation:** introduce the topic by using the suggested video resources or other alternatives. Engage learners in discussion about construction methods and techniques, materials used, edge details, performance requirements, specifications and finishes of roads and paths. • **Group activity:** allocate each group a topic related to roads and paths to conduct research. Ask all groups to consider: construction methods and techniques; materials used; edge details; performance requirements; specifications and finishes. Allocate topics from the following: o tarmacadam to footpaths o tarmacadam to vehicular areas and road o block paving o *in situ* concrete o precast concrete paving. • **Plenary:** invite groups to share their findings with the class. Draw on key points and summarise.	Appropriate PPE YouTube: 'Tarmacadam roadway laying' YouTube: 'Fastest block paver in UK' YouTube: 'Complete precast concrete paving slab installation'
25	**D4:** Sustainable urban drainage systems • Methods of temporary storage of excess surface water	GW	• **Tutor presentation:** introduce the topic by showing suggested resources emphasising the significance of sustainable urban drainage systems. Discuss the various methods used for temporary storage and to allow water to percolate, their characteristics, advantages and disadvantages. • **Group activity:** learners work in small groups; each group is allocated a topic related to sustainable urban drainage systems to conduct research. Ask all groups to consider	YouTube: 'Ever wondered where the rain goes? Sustainable drainage animation' YouTube: 'Designs that hold water: sustainable drainage systems (SUDS) explained – pt1'

	• Methods allowing natural percolation to groundwater		methods, use, characteristics, advantages and disadvantages of using such systems. Allocate topics from the following: ○ swales ○ infiltration basins ○ extended detention basins ○ wet ponds ○ infiltration systems ○ filter strips ○ porous surfaces. • **Plenary:** invite groups to share their findings with the class. Draw on key points and summarise.	YouTube: 'New retention pond' YouTube: 'Filter strip (English version)'
26–30	Unit Assessment using Pearson Set Assignment	AW	• **Tutor presentation:** overview of assignment requirements, nature of assessment and timeline for completion/submission. Make reference to the in-class tasks completed and their relationship to the assessment. • **Individual activity:** learners have the opportunity to begin work on their assignment or discuss further with you.	Pearson Set Assignment Brief

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling students to access them through the school/college intranet.