

10. Digital technology in construction

Sample scheme of work

This sample scheme of work covers both classroom- and workshop-based learning for **Digital technology in construction**. It is based on 3 hours per session for 5 sessions. It is an example only of a possible scheme of work and is based on theory and practical workshops within an FE centre, but can be amended to suit all learning facilities with the necessary adjustments to meet individual learners' needs.

You can use the sample scheme of work as it is, adjust it or extract content to create a scheme of work to suit your delivery needs. It can also be adjusted by adding theory and practical workshops to support learners who have/need additional learning time.

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Sample scheme of work

Course/qualification: T Level Technical Qualification in Construction: Onsite Construction (Level 3) **Tutor's name:**

Number of sessions: 5

Delivery hours: 15

Venue:

Group:

Criteria

- 10.1** Internet of things
- 10.2** Digital engineering techniques
- 10.3** Opportunities for the use of technology

Session	Criteria	Activities and resources	Skills check
1 3 hours	10.1 Internet of things	Activities: - Tutor to deliver PowerPoint 1: The internet of things and introduce the topic (up to slide 4). - Tutor to explain the internet of things by listing technology connected to the internet of things.	PowerPoint 1 Worksheet 1 Worksheet 2 Worksheet 3 Observation Group discussion

Session	Criteria	Activities and resources	Skills check
		• Tutor to facilitate a discussion about the internet of things and common household technology connected to the internet of things. • Tutor to deliver content on smart cities in PowerPoint 1. • Tutor to explain the concept of smart cities. • Classroom discussion on smart cities and their development. • Tutor to explain the concept of smart buildings in PowerPoint 1: The internet of things. • Practical demonstration of building automation systems dashboard: https://www.entelec.eu/solutions/control-room • Classroom discussion on points and building automation systems. • Tutor to explain smart maintenance within the construction industry. • Classroom discussion on the benefits of smart maintenance: https://www.intelligentbuildingeurope.com • Tutor to explain the concept of just-in-time (JIT). • Learner to complete Worksheet 1: Just-in-time (JIT). • Tutor to discuss the advantages and disadvantages of just-in-time (JIT). • Classroom discussion on smart building asset management. • Classroom discussion on smarter buildings. • Learner to complete Worksheet 2: Smart buildings.	Q&A

Session	Criteria	Activities and resources	Skills check
		- Tutor to explain the development of smart concrete: https://www.concretecentre.com/Specification/Innovative-concrete/Smart-concrete.aspx - Tutor to discuss artificial intelligence. - Classroom discussion on AI in construction. - Tutor to discuss off-site manufacturing. - Learner to complete Worksheet 3: Recap on internet of things. Resources: PowerPoint 1 Worksheet 1 Worksheet 2 Worksheet 3	
2 3 hours	10.2 Digital engineering techniques	Activities: - Tutor to deliver PowerPoint 2: Digital engineering techniques and introduce the topic on digital engineering techniques. - Tutor to explain digital engineering techniques. - Watch video on digital engineering techniques: https://www.youtube.com/watch?v=kab2WdXEUBg&feature=youtu.be	PowerPoint 2 Worksheet 4 Worksheet 5 Worksheet 6 Observation Group discussion Q&A

Session	Criteria	Activities and resources	Skills check
		• Learner to complete Worksheet 4: Industrial strategy, Construction 2025. • Classroom discussion on government industrial strategy: Construction 2025. • Watch video on structural analysis simulations: https://youtu.be/C17Alt0ryBg • Tutor to explain structural analysis simulations. • Watch video on wind load simulations: https://www.youtube.com/watch?v=jmsFC0mNayM • Classroom discussion on wind load simulations and structural analysis simulations. • Tutor to explain 3D rendering of building assets. • Classroom discussion on computer-generated imagery (CGI). • Learner to produce a step-by-step guide of the CGI production process. • Learner to use 3D software applications (if available). • Learner to complete Worksheet 5: Uses of augmented reality in construction. • Classroom discussion on AR underground asset mapping. • Tutor to explain and demonstrate 3D modelling.	

Session	Criteria	Activities and resources	Skills check
		- Learner to complete Worksheet 6: Digital engineering techniques. Resources: PowerPoint 2 Worksheet 4 Worksheet 5 Worksheet 6	
3 3 hours	10.2 Digital engineering techniques	Activities: - Tutor to deliver PowerPoint 3: Digital engineering techniques (2). - Tutor to explain the types of surveying equipment. - Tutor to demonstrate the use of surveying equipment. - Learner to familiarise themselves with surveying equipment. - Class discussion on photogrammetry. - Tutor to explain LiDAR. - Watch video on virtual surveying using drones: https://youtu.be/JMv61HpdR2c - Class discussion on 3D scanning. - Watch video on 3D scanning: https://share.vidyard.com/watch/2CFpwg7Anvd3hfeetZj36i	PowerPoint 3 Worksheet 7 Observation Group discussion Q&A

Session	Criteria	Activities and resources	Skills check
		• Learner to watch case study on Matterport and make notes: https://youtu.be/aHuHNjdrdHs • Class discussion on virtual reality (VR) technologies. • Learner to list advantages and disadvantages of VR. • Watch video on VR: https://www.youtube.com/watch?v=R4gWpXuPAXo • Tutor to explain augmented reality (AR). • Watch video on AR: https://www.youtube.com/watch?v=R4gWpXuPAXo • Class discussion on VR and AR. • Learner to research Trimble site vision. • Tutor to explain the use of surveying guidance systems. • Watch video on guidance systems: https://youtu.be/lmqvzKEOe6M • Tutor to explain digital artist impressions. • Learner to complete Worksheet 7: Drones, sensors and GPS. Resources: • PowerPoint 3 • Worksheet 7	

Session	Criteria	Activities and resources	Skills check
4 3 hours	10.3 Opportunities for the use of technology	Activities: • Tutor to deliver PowerPoint 4: Opportunities for the use of technology to slide 2. • Tutor to explain Computer Numerical Control Machining (CNC). • Watch video on CNC: https://youtu.be/IEyNWtM6MW4 • Tutor to deliver remainder of PowerPoint 4: Opportunities for the use of technology to slide 3 -13. • Tutor to explain the development of machine manufacturing. • Watch video on development of machine manufacturing: https://youtu.be/rm3xVxUfJnE • Class discussion on machine manufacturing. • Tutor to explain robotics in construction. • Watch video on bricklaying robots: https://youtu.be/l1O1yRZO2Fg • Learner to complete Worksheet 8: Opportunities for the use of technology. • Tutor to discuss additive manufacturing through robotics. • Watch video on additive manufacturing through robotics:	Worksheet 8 Observation Group discussion Q&A

Session	Criteria	Activities and resources	Skills check
		https://www.youtube.com/watch?v=69HrqNnrfh4 - Class discussion on the benefits and limitations of manufacturing through robotics. - Watch video on additive manufacturing project: https://youtu.be/TtcGH1iLM1w - Class discussion on WASP case study. - Watch video on construction of buildings on command, European developments: https://youtu.be/Px_g7XnzMeo - Learner to complete Worksheet 9: Opportunities for the use of technology. Resources: PowerPoint 4 Worksheet 8 Worksheet 9	
5 3 hours	10.3 Opportunities for the use of technology	Activities: - Tutor to deliver PowerPoint 5: Opportunities for the use of technology (2) and explain CAD and CAM software. - Class discussion on CAD/CAM in global industries.	PowerPoint 5 Worksheet 10 Observation Group discussion Q&A

Session	Criteria	Activities and resources	Skills check
		- Tutor to explain CAD/CAM in aerospace and the motor industries and ask learners to consider how the advances could be applied to construction. - Learner to research other industries where CAD/CAM is used. - Tutor to explain other industries where CAD/CAM is used. - Class discussion on modelling. - Watch video on simulation: https://youtu.be/wMwhFwunBq8 - Watch video on models: https://youtu.be/uWuNfhDvZz8 - Class discussion on computational modelling: technological futures. - Learners to research where modelling is used with construction. - Tutor to explain types of modelling used. - Learners to complete Worksheet 10: Opportunities for the use of technology. - Learner to complete Multiple choice questions. Resources: PowerPoint 5 Worksheet 10 Multiple choice questions	Multiple choice questions

