Unit 302: Constructing cut roofing

Sample scheme of work

Please revise the following text to suit your requirements.

This sample scheme of work covers both classroom and workshop based learning for unit 302. It is based on three-hour sessions, each having a 15-minute break halfway through the session. The scheme of work includes 12 theory lessons covering cut roof terminology and installation, with a further theory/practical session concentrating on risk assessments. These are followed by 16 practical sessions to allow the learner to practise activities involved with constructing cut roofing. Within the practical activities there is scope to challenge and stretch learners.

This is an example only of a possible scheme of work and is based on theory and practical within an FE centre delivering the Level 3 Advanced Technical Diploma in Site Carpentry. Unit 302 is designed as a stand-alone unit and should be used in conjunction with the standards set for the qualification to ensure full coverage of the learning requirements.

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.

Reference is made within the scheme of work to learning materials and other resources required for each session. A version of this scheme of work with **full supporting materials** is also available to purchase on **SmartScreen.co.uk**. Resources consist of physical equipment required, as well as any technologies needed. Where possible we have included blended learning activities that make good use of technology so as to help centres fulfil the minimum amount of digital teaching recommended by government.

Centres should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the section content section, City & Guilds regards these as essential in the teaching of the qualification:

- health and safety considerations, in particular the need to impress upon learners the fact that they must preserve the health and safety of others as well as themselves
- functional skills (mathematics, English and ICT)
- extension tasks and differentiation, inclusion, entitlement and equality issues
- spiritual, moral, social and cultural issues
- environmental education and related European issues
- British values
- values and behaviours
- use of information learning technology (ILT).

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Unit 302: Constructing cut roofing

Sample scheme of work

Course/qualification: _____ **Tutor's name**: _____

Number of sessions: 30 **Delivery hours**: 90 **Venue**: _____ **Group**: _____

Aims	**To enable learners to:**
• The purpose of this unit is for learners to develop a thorough understanding of the principles and processes of constructing hand cut roofs using traditional jointing techniques. • They will learn how to erect and fix the components safely using traditional methods, ensuring that all work undertaken complies with current Building Regulations.	• Understand roofing types and component terminology • Construct a traditional cut roof

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
Theory activities **Session 1** (3 hours)	**Learning outcome 1: Understand roofing types and component terminology** **Topic 1.1 Types of roof construction** • Identify different types of roof design	**Activities:** • Introduction to unit • Tutor to outline different types of roof profiles: – flat roof – lean-to roof – mono-pitch – gable-end roof – hipped-end roof – mansard roof – valley – part gable/part hipped end – gambrel roof – jerkin-head roof – gablet • Learners to complete Activity 1 by identifying roof types • Tutor to outline the different types of cut roof construction for single roof: – couple – closed couple – collared • Learners to complete Activity 2 by labelling component parts of a single roof	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Outline the different types of cut roof construction for double and triple roofs • Learners to complete Activity 3 by labelling component parts of a double and triple roof • Outline typical problems associated with cut roofing: – out of square building – unequal pitches – split ridges – wall plates are not parallel • Learners to split into small groups to complete Activity 4 by listing the possible construction problems and possible actions for one of the scenarios listed. **Resources:** • Activity 1: Illustrations of different types of roofs for learners to identify • Activity 2: Diagram of a single roof for learners to identify and label component parts • Activity 3: Diagrams of a double roof and a triple roof for learners to identify and label component parts • Activity 4: List of four scenarios (out-of-square wall plate, unequal pitch, split ridge, wall plates not parallel) for learners to analyse	

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
Theory activities **Session 2** (3 hours)	**Learning outcome 1: Understand roofing types and component terminology** **Topic 1.2: Roof components** • Identify different areas contained within a cut roof • Identify component parts to cut roofing	**Activities:** • Outline the main areas associated with traditional cut roofs: – hipped – valley – gable – verge – eaves • Learners to complete Activity 5 by identifying roof areas • Outline the different components found within a traditional cut roof: – wall plate – ridge board – common rafters – hip rafters – saddle board – crown rafter – valley rafter – hip jack rafter – flying jack rafters – cripple rafters – purlins – gable ladder – lay board – soffit	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		– fascia – barge board – ceiling joist – collar ties – restraining straps – binders – struts – angle tie – dragon tie and beam – trimmers – studs • Learners to complete Activity 6 by identifying roof components • Learners to complete Activity 7 by identifying the purpose of different roof sections **Resources:** • Activity 5: Diagram of a building for learners to identify different roof areas • Activity 6: Diagram of a building for learners to identify different roof components • Activity 7: Diagrams of different roof sections for learners to provide brief description of its purpose in a traditional cut	

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
Theory activities **Session 3** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.1: Building regulations** • Interpret building regulations associated with traditional cut roofing	**Activities:** • Recap of previous session • Outline the purpose of building regulations • Outline building regulations part A and describe how they apply to the construction of traditional cut roofing • Learners to complete Activity 8 by interpreting span tables and answering questions • Outline the purpose of restraining straps and their positioning using Activity 9 by labelling component parts of roof straps • Outline approved document L and describe different principles in retaining heat and reducing power consumption when considering traditional cut roofing • Learners to complete Activity 10 by labelling component parts of insulation **Resources:** • Activity 8: Questions on span tables (eg maximum spacings, maximum imposed loads, etc) for learners to answer • Activity 9: Diagram of roof straps for learners to label • Activity 10: Diagram of insulation for learners to label • Planning Portal: www.planningportal.gov.uk/ • DFP Technical Booklet D 2009: https://www.dfpni.gov.uk/sites/default/files/publications/dfp/DFP%20Technical%20Booklet%20D%202009%20-%20%20Structure.pdf • The Building Regulations 2010 Approved Document L1A, Conservation of fuel and power in new dwellings:	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_L1A_2013.pdf	
Theory activities **Session 4** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.2: Working safely at height** • Working safely at height	**Activities:** • Recap of previous session • Outline the purpose of the working at height regulations • Name and briefly outline the scope of regulations to be considered while working at height • Learners to complete Activity 11 by identifying five health and safety related regulations that need to be considered and taken into account of before starting work on a traditional cut roof and giving a brief outline of the purpose of each of the regulations • Identify types of access equipment and describe when each one would be typically used • Learners to complete Activity 12 by correctly naming the type of access equipment shown and giving a brief description of its uses **Resources:** • Activity 11: For learners to list health and safety regulations • Activity 12: Diagrams of types of access equipment for learners to identify and describe (to include independent tubular scaffolding, putlog tubular scaffolding, working platform on tubular scaffolding, mobile tower scaffold, access ladder inclined at 75°) • The Work at Height Regulations 2005: http://www.legislation.gov.uk/uksi/2005/735/contents/made • HSE publication *Working at height: A brief guide*:	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		http://www.hse.gov.uk/pubns/indg401.pdf • HSE publication *Slips & trips and falls from height in Great Britain, 2014*: http://www.hse.gov.uk/statistics/causinj/slips-trips-and-falls.pdf • Builder Bill, 'Roofing safety': http://www.builderbill-diy-help.com/roofing-safety.html	
Theory and practical activities **Session 5** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.2: Working safely at height** • Carry out risk assessment for constructing traditional cut roof	**Activities:** • Recap of previous week • Outline the process for carrying out risk assessments • Learners to identify the risk assessment process: – hazards – risks – people at risk – control measures • Learners to complete Activity 13 (workshop activity) by completing a sample blank risk assessment form while inspecting the workshop area that they will be using to carry out the practical activities, identifying all significant hazards and establishing suitable control measures along with time periods • Learners to complete Activity 14 by brainstorming considerations for a method statement for cut roofing • Split the group up into smaller groups with each group completing Activity 15 by writing a model method statement for constructing traditional cut roofing **Resources:** • Activity 13: A sample blank risk assessment form to be used by the	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		learners while inspecting the workshop area that they will be using to carry out the practical activities • Activity 14: Method statement prompts for construction of a traditional cut roof (health and safety, tools required, materials required, process of assembly) • Activity 15: Blank method statement • HSE, audio on five steps to risk assessment: http://www.hse.gov.uk/pubns/talkingleaflets/indg163.mp3 • HSE publication *Example risk assessment for a woodworking company*: http://www.hse.gov.uk/risk/casestudies/pdf/woodworking.pdf • HSE, 'Interactive risk assessments': http://www.hse.gov.uk/risk/assessment.htm • HSE, 'Identify the hazards': http://www.hse.gov.uk/risk/identify-the-hazards.htm	
Theory activities **Session 6** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining lengths and angles** • Information requirements for determining lengths and angles	**Activities:** • Recap of previous week • Tutor to define terminology for development of common rafter • Learners to complete Activity 16 by identifying the components and the plumb cut, seat cut and pitch on the common rafter • Tutor to identify setting out positions to a common rafter • Learners to complete Activity 17 by identifying setting out terms on a common rafter • Tutor to identify abbreviated labels used in drawings for traditional cut roofing • Learners to complete Activity 18 by defining the abbreviated labels	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		used for roofing components **Resources:** • Activity 16: Diagram of a common rafter for learners to identify the components (rise, run, pitch, span and common rafter length) and identify the plumb cut, seat cut and pitch • Activity 17: Diagram of a common rafter for learners to identify setting out terms • Activity 18: List of abbreviated labels for roofing components for learners to define • Builder Bill, 'Roof framing', traditional roofing: http://www.builderbill-diy-help.com/roof-framing.html • Blocklayer.com, Rise and run app: http://www.blocklayer.com/riserun.aspx	
Theory activities **Session 7** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining lengths and angles** • Methods used to determine rafter lengths and bevels	**Activities:** • Recap of previous session • Learners to produce a scaled drawing (orthographic projection of a hipped and gable ended roof to a scale of 1:50) and develop the true lengths and angles of common rafters using the specification given in Activity 19 • Learners to label the following parts on the scaled drawing: span, run, seat cut to common rafter, true length common rafter, rise, plumb cut to common rafter **Resources:** • Activity 19: Specification for a hipped and gable ended roof for learners to use to draw an orthographic projection to a scale of 1:50 (Specification: span of 6m, length of 8m, pitch of 40º)	• Observation • Q&A • Activity

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Builder Bill, 'Drawing equipment': http://www.builderbill-diy-help.com/roof-framing.html	
Theory activities **Session 8** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining lengths and angles** • Methods used to determine rafter lengths and bevels	**Activities:** • Recap of previous week • Learners to produce a scaled drawing (orthographic projection of a hipped and gable ended roof to a scale of 1:50) and develop the true lengths and angles of hip rafters using Activity 20 • Learners to produce a scaled drawing and develop the dihedral angle for the hip rafter using Activity 21 • Learners to produce a scaled drawing and develop the hip rafter edge cut using Activity 22 **Resources:** • Activity 20: Specification for hip rafter development (span of 6m, height of 8m) and instructions for how to produce the scaled drawing • Activity 21: Specification for hip rafter dihedral development and instructions for how to produce the scaled drawing • Activity 22: Specifications for hip rafter edge cut development and instructions for how to produce the scaled drawing • drawing equipment • Builder Bill, 'Roof framing': http://www.builderbill-diy-help.com/roof-framing.html	• Observation • Q&A • Activities
Theory activities **Session 9** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining**	**Activities:** • Recap of previous week • Learners to produce a scaled drawing and develop the true lengths and angles of jack rafters using Activity 23	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
	lengths and angles • Methods used to determine rafter lengths and bevels	• Learners to produce a scaled drawing and develop the purlin edge and side cuts using Activity 24 **Resources:** • Activity 23: Specification for jack rafter development and instructions for how to produce the scaled drawing • Activity 24: Specification for purling edge and side cuts and instructions for how to produce the scaled drawing • Drawing equipment • Carpentry-tips-and-tricks.com: http://www.carpentry-tips-and-tricks.com/Rafter-lengths.html	
Theory activities **Session 10** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining lengths and angles** • Methods used to determine rafter lengths and bevels	**Activities:** • Recap of previous week • Learners to produce a scaled drawing and develop the valley rafter using Activity 25, then label the component parts • Tutor to outline the principles involved with setting rafters from a ready reckoner book • Learners to use Activity 26 along with a metric roofing ready reckoner to find the angles and true lengths for the rafters specified **Resources:** • Activity 25: Valley rafter development details • Activity 26: Ready reckoner and specification for learners to find the angles and true lengths for the rafters • Drawing equipment • Roofing Ready Reckoner app:	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		https://play.google.com/store/apps/details?id=appinventor.ai_garysaunders158.Roofer&hl=en_GB • http://onlinelibrary.wiley.com/book/10.1002/9780470690581 • Carpentry-tips-and-tricks.com: http://www.carpentry-tips-and-tricks.com/Rafter-lengths.html	
Theory activities **Session 11** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.3: Determining lengths and angles** • Methods used to determine rafter lengths and bevels	**Activities:** • Recap of previous week • Tutor to outline the process of using a roofing square • Learners to complete Activity 27 to set out a common rafter using a roofing square • Tutor to outline the process of using the rise and run method of producing a rafter • Learners to complete Activity 28: Rise and run, using the link below to answer the scenarios for setting out common rafters (http://www.blocklayer.com/Roof-Pitch.aspx) **Resources:** • Activity 27: Specification for setting out a common rafter using a roofing square (Pitch 40°, Span 2m, Eaves 100mm) • Activity 28: Scenarios for learners to answer for setting out common rafters (Scenario 1: given the run of 1000mm and a pitch of 40° what are the rise and the pitch; Scenario 2: given the run of 1500mm and a pitch of 8:12 what are the rise and the angle; Scenario 3: given the run of 3000mm and the angle of 10° what are the rise and the pitch, Scenario 4: given the run of 3000mm and the rise of 3000mm what are the angle and pitch) • Roofing square	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Links to finding rafter angles: – http://www.blocklayer.com/riserun.aspx – http://www.blocklayer.com/Roof-Pitch.aspx – http://www.blocklayer.com/Roof/default.aspx	
Theory activities **Session 12** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.4: Fixing and positioning rafters** • Learners must be able to cut, position and fix rafters to form roof structures using the correct sequence	**Activities:** • Recap of previous week • Tutor to outline the process of erecting rafters for gable end and hipped-ended roofs • Learners to complete Activity 29 by listing the basic stages in the installation process for the erection of the cut roof members to a hipped roof, including health and safety aspects as well as installation stages • Learners to identify a means of joining structural timber using Activity 30, showing how this would be done with the aid of sketches • Learners to identify the location and stages of assembling a cut roof using Activity 31 • Tutor to summarise session **Resources:** • Activity 29: Information for learners to list the steps for fixing rafters to a gable ended roof • Activity 30: Information for learners to identify how to join structural timbers • Activity 31: Information for learners to identify how to position roof timbers	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Link to erecting a gable end roof: www.youtube.com/watch?v=iKyD4vR_6-M • Link to erecting a hipped-ended roof: www.youtube.com/watch?v=p8s7a_OJKnUhttp://www.youtube.com/watch?v=p8s7a_OJKnU • Link to erecting a roof with a valley: www.youtube.com/watch?v=HcBr9mdoE5s	
Theory activities **Session 13** (3 hours)	**Learning outcome 2: Construct a traditional cut roof** **Topic 2.4: Fixing and positioning rafters** **and** **Topic 2.5: Eaves and gable finishes** • Learners must know how to form openings within the roof construction. • Types of opening: chimneys, dormers and roof lights • Types of dormers: flat, segmental, pitched and eyebrow • Learners must have the knowledge and understanding of how to	**Activities:** • Recap of previous week • Tutor to outline the process to form openings in traditional cut roof structures • Learners to complete Activity 32 by identifying the components within an opening in a new and an existing roof to install roof lights, chimneys and dormers • Learners to identify components used to complete opening around chimney stack using Activity 33 • Learners to use Activity 34 to identify the components in a dormer wall • Learners to complete Activity 35 by brainstorming considerations for a method statement for a dormer roof assembly • Learners to complete Activity 36 in pairs using Activity 35, by discussing ideas on how to form an opening in a constructed traditional cut roof to construct a pitched dormer window as shown below and developing a method statement stating how you would form the opening in a roof and how you would construct the new dormer framework which is to have a pitched roof and a gable end	• Observation • Q&A • Activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
	finish a traditional cut roof at the eaves and gable • Flush, open, closed and sprocketed	• Tutor to identify types of eaves finishes: – open – closed – flush – sprocket • Working in pairs, learners to access the Planning Portal and find the Building Regulation 200 approved document F and establish how much ventilation needs to be installed into the eaves detailing for a roof having a pitch of at least 15°. Learners to state their findings with diagrams and list any possible problems for roofs having flat ceiling and roofs where the ceiling follows the shape of the roof • Tutor to summarise session **Resources:** • Activity 32: Drawing of trimmings to openings for learners to label component parts • Activity 33: Drawing of a chimney opening for learners to label component parts • Activity 34: Diagram of dormer wall construction showing the following parts for learners to label and describe: plasterboard, breather membrane, decorative finish, insulation, structural sheathing, timber studwork, external cladding • Activity 35: List of considerations for assembly of a traditional dormer window for learners to brainstorm (Health and safety, tools required, materials required, process of assembly) • Activity 36: Information for a dormer window construction method statement	

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Activity 37: Planning portal roof ventilation incorporated into the eaves detailing • Link to planning portal building regulations ventilation: http://www.planningportal.gov.uk/uploads/br/BR_PDF_ADF_1995.pdf	
Practical activity **Sessions 14–29** (48 hours)	**Learning outcome 2: Construct a traditional cut roof** • Calculate rafter lengths • Calculate angles of rafter cuts • Cut and fix rafters to given specifications for: — gable ended roofs — hipped-ended roofs valley roofs • Construct openings in roofs to given specifications for: — chimney opening — pitched dormer roof • Select and use access equipment as appropriate for the given task in accordance with current regulations • Follow current environmental and relevant health and safety regulations relevant to constructing traditional cut	**Session 14 to 29: practical workshop activities following relevant regulations and workshop rules. Set out and assemble pitched roofs incorporating hips, valleys, trimming out and dormer windows.** **Activities:** Learners should: • follow relevant health and safety guidance • prepare method statement for roofing exercises • select correct tools and materials to prepare timber for assembly • develop bevels and true lengths using: — roofing square — ready reckoner — scale drawing development — rise and run • mark out rafters • cut rafters • assemble rafters • trim out opening • complete activities 38 to 41 • work in pairs to construct a dormer window, following the steps	• Observation • Q&A • Practical activities

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
	roof	below, checking with the tutor before starting each stage: – Stage 1: Construct a lean-to roof to the dormer window specification given – Stage 2: Trim out the roof to form an opening to accept a dormer window – Stage 3: Construct a dormer window with a pitched roof incorporating the same pitch as the main roof using lay boards to form the valley and having a gable end to the dormer **Resources:** • Selection of timber and timber based material • Portable power tools • Hand tools • Activity 38: Learners to set out common rafter using a roofing square using the roof specification below • Activity 39: Learners to set out hip rafter without dihedral angle using a roofing square using the roof specification below • Activity 40: Learners to set out hip rafter with dihedral angle using a roofing square using the roof specification below • Activity 41: Setting out valley rafter angle using a roofing square using the roof specification below • Individual learning plans: for each session, learners should outline the objectives that they reasonably expect to complete in that session. As the sessions progress, feedback from the previous sessions will guide and focus their future learning aims and objectives. • Roof specification: pitch 40°; centres 300mm; eaves overhang 100mm	

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Session	Objectives/learning outcomes **The learner will:**	Activities and resources	Assessment
		• Dormer window specification: pitch 40°; 6 common rafter at centres 300mm; eaves overhang 100mm; run 1200mm; dormer opening decided by tutor	
Theory activity **Session 30** (3 hours)	**Learning outcome 1: Understand roofing types and component terminology** **Learning outcome 2: Construct a traditional cut roof** Review of unit	**Activities:** • Learners to review Unit 302 and complete multiple choice questions **Resources:** • Set of 20 end of unit multiple choice test questions to check learner's understanding of the unit	• Observation • Q&A • End of unit questions

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