QUALIFICATION HANDBOOK

Diploma in Wood Machining for Joinery Manufacture at SCQF Level 5 (6806-28)

February 2016 Version 2

City & Guilds

Qualification at a glance

Subject area	Construction
City & Guilds number	6806-28
Age group approved	16-18, 19+
Entry requirements	None
Assessment	Multiple choice/assignment
Support materials	Centre handbook Assessor guidance Task manual
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	**City & Guilds number**
Diploma in Wood Machining for Joinery Manufacture at SCQF Level 5	6806-28

Version and date	**Change detail**	**Section**
V2 February 2016	Unit 201 amended	Units
	City & Guilds group statement amended	Useful contacts
	Phone numbers deleted	Useful contacts

Contents

1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	It is for candidates who work or want to work as Wood Machinists.
What does the qualification cover?	It allows candidates to learn, develop and practice the skills required for employment and/or career progression in Wood Machining. It covers the setting and operating of machines for the following activities: • sawing • planing • jointing • profiling.
What opportunities for progression are there?	It allows candidates to progress Into employment as a Wood Machinist in the Construction Sector.

Structure

To achieve the **Diploma in Wood Machining for Joinery Manufacture at SCQF Level 5 (6806-28)**, learners must achieve **42** credits from the mandatory units below. Learners may also achieve up to **13** credits from the elective units, however this will not contribute towards achievement of the overall qualification.

	City & Guilds unit number	Unit title	Credit value
Mandatory			
	Unit 131	Principles of machine manufactured joinery	5
	Unit 201	Health, safety and welfare in construction	7
	Unit 262	Setting and operating fixed sawing machines	8
	Unit 263	Setting and operating fixed planing machines	7
	Unit 264	Setting and operating fixed jointing machines	7
	Unit 265	Setting and operating fixed profiling machines	8
Elective			
	Unit 266	Setting and operating fixed sanding machines	6
	Unit 267	Setting and operating NC/CNC machines	7

2 Centre requirements

Approval

The approval process for Construction qualifications is available at our website. Please visit **www.cityandguilds.com/construction** for further information.

Resource requirements

Physical resources and site agreements

Centres will have well equipped workshops with a comprehensive range of hand and portable power tools that meet current industry standards. All powered equipment should be well maintained and PAT certified. All machinery shall be to industrial standards and comply with current regulations.

Centre staffing

All staff who assess (tutor/deliver) this qualification must:

- have recent relevant experience in the specific area they will be teaching;
- be technically competent in the area for which they are delivering training and/or have experience of providing training;
- have a CV available demonstrating relevant experience and any qualifications held.

All staff who quality assure this qualification must:

- have a good working knowledge and experience within the construction industry;
- have an established strategy and documentary audit trail of internal quality assurance;
- have a good working knowledge of quality assurance procedures;
- have a CV available demonstrating relevant experience and any qualifications held.

While the Assessor/Verifier (A/V) units/TAQA are valued as qualifications for centre staff, they are not currently a requirement for this SCQF qualification. However, we encourage trainers and assessors to qualify to the current TAQA standard.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for this qualification. However, centres must ensure that candidates have the potential and opportunity to gain the qualification successfully.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as these qualifications are not approved for under 16s.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific training needs,
- support and guidance they may need when working towards their qualification.
- any units they have already completed, or credit they have accumulated which is relevant to the qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the learner fully understands the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for this qualification:

Description	How to access
Assessor guidance	**www.cityandguilds.com**
Task manual	**www.cityandguilds.com**
Qualification Approval Form	**www.cityandguilds.com**

4 Assessment

Unit	Title	Assessment method	Where to obtain assessment materials
131	Principles of machine manufactured joinery	City & Guilds e-volve multiple choice test. The test covers all of the knowledge in the unit.	Examinations provided on e-volve.
201	Health, safety and welfare in construction	City & Guilds e-volve multiple choice. The test covers all of the knowledge in the unit.	Examinations provided on e-volve.
262	Setting and operating fixed sawing machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**
263	Setting and operating fixed planing machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**

Unit	Title	Assessment method	Where to obtain assessment materials
264	Setting and operating fixed jointing machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**
265	Setting and operating fixed profiling machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**
266	Setting and operating fixed sanding machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**

Unit	Title	Assessment method	Where to obtain assessment materials
267	Setting and operating NC/CNC machines	Multiple choice question paper, covering knowledge outcomes. Practical assignment, covering performance outcomes. Both assessments are set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure they are properly carried out.	**www.cityandguilds.com**

Test specifications

The way the knowledge is covered by each test is laid out in the tables below:

Test 1: Unit 201 Health, safety and welfare in construction
Duration: 60 minutes

Unit	Outcome	Number of questions	%
201	1 Know the health and safety regulations, roles and responsibilities	7	17.5
	2 Know accident and emergency reporting procedures and documentation	5	12.5
	3 Know how to identify hazards in the workplace	7	17.5
	4 Know about health and welfare in the workplace	3	7.5
	5 Know how to handle materials and equipment safely	2	5
	6 Know about access equipment and working at heights	3	7.5
	7 Know how to work with electrical equipment in the workplace	4	10
	8 Know how to use personal protective equipment (PPE)	5	12.5
	9 Know the cause of fire and fire emergency procedures	4	10
	Total	**40**	**100**

Test 2: Unit 131 Principles of machine manufactured joinery
Duration: 70 minutes

Unit	Outcome	Number of questions	%
131	1 know timber, timber products and conversion methods	10	29
	2 Know how to communicate and interpret information used in joinery manufacture	17	49
	3 Know how to mark out for joinery products	4	11
	4 Know how to plan for safe machining operations	4	11
	Total	**35**	**100**

Test 3: Unit 262 Setting and operating fixed sawing machines
Duration: 40 minutes

Unit	Outcome	Number of questions	%
262	1 Know the principles of using sawing machines safely	8	40
	2 Know how to change blades for sawing machines	7	35
	4 Understand how to set up and operate sawing machines	5	25
	Total	**20**	**100**

Test 4: Unit 263 Setting and operating fixed planing machines
Duration: 30 minutes

Unit	Outcome	Number of questions	%
263	1 Know the principles of using planing machines safely	7	46
	2 Know how to change cutter knives for planing machines	5	33
	4 Understand how to set up and operate planing machines	3	21
	Total	**15**	**100**

Test 5: Unit 264 Setting and operating fixed jointing machines
Duration: 30 minutes

Unit	Outcome	Number of questions	%
264	1 Know the principles of using jointing machines safely	9	53
	2 Know how to change tooling for jointing machines	5	29
	4 Understand how to set up and operate jointing machines	3	18
	Total	**17**	**100**

Test 6: Unit 265 Setting and operating fixed profiling machines
Duration: 40 minutes

Unit	Outcome	Number of questions	%
265	1 Understand tools and materials used for manufacturing bench joinery products	9	45
	2 Understand how to prepare for manufacturing bench joinery products	6	30
	4 Understand how to set up and operate profiling machines	5	25
	Total	**20**	**100**

Test 7: Unit 266 Setting and operating fixed sanding machines
Duration: 30 minutes

Unit	Outcome	Number of questions	%
266	1 Know the principles of using sanding machines safely	7	44
	2 Know how to change abrasives for sanding machines	5	31
	4 Understand how to set up and operate sanding machines	4	25
	Total	**16**	**100**

Test 8: Unit 267 Setting and operating NC/CNC machines
Duration: 30 minutes

Unit	Outcome	Number of questions	%
267	1 Know the principles of using sanding machines safely	7	44
	2 Know how to change abrasives for sanding machines	5	31
	4 Understand how to set up and operate sanding machines	4	25
	Total	**16**	**100**

5 Units

Structure of units

These units each have the following:

- City & Guilds reference number
- title
- level
- credit value
- unit aim
- learning outcomes which are comprised of a number of assessment criteria

Range explained
Range gives further scope on what areas within the assessment criteria must be covered. The range in a unit **must** be taught to learners and parts of the range will be assessed.

Unit 131 Principles of machine manufactured joinery

Level:	4
Credit value:	5
Aim:	The aim of this unit is to provide the learner with the knowledge of: • timber used in machine manufactured joinery • how to communicate and interpret information • how to mark out for joinery products • how to plan for safe machining operations.

Learning outcome
The learner will: 1. know timber, timber products and conversion methods.
Assessment criteria
The learner can: 1.1 identify types of **timber** 1.2 identify types of **manufactured boards** 1.3 identify standard sizes of **materials** 1.4 identify **methods** of timber conversion 1.5 identify **defects** found in timber 1.6 state **methods** of drying timber.

Range
Timber Softwoods (European red wood, white wood, Douglas fir, yellow pine) and hardwoods (oak, mahogany, meranti, sapele, utile, teak, iroko, beech, ash, maple, cherry). **Manufactured boards** medium density fibre board (MDF), plywood, orientated strand board (OSB), chipboard, hardboard**.** **Materials** Softwoods, hardwoods, manufactured boards. **Methods (1.4)** Quarter sawn, through and through, tangential, boxed heart.

Defects
Natural (sloping grain, knots, shakes, upset, waney edge, resin pockets, foreign bodies, decay, pith, blue stain, insect infestation); seasoning (cupping, winding, twist, case hardening, bowing, springing, collapse).

Methods (1.6)
Air, kiln, to appropriate moisture content.

Learning outcome

The learner will:

2. know how to communicate and interpret information used in joinery manufacture.

Assessment criteria

The learner can:

2.1 state **job roles** within the joinery manufacturing industry
2.2 identify **documents** used to communicate information within the joinery manufacturing industry
2.3 identify **information sources** required for setting out **joinery products**
2.4 state the **methods** of checking accuracy of information
2.5 state types of **discrepancies** that can be identified when setting out.
2.6 identify **component parts** of **joinery products**
2.7 identify sectional details of joinery **component parts**
2.8 identify **joints** used in the construction of **joinery products.**

Range

Job roles
Designer/architect, manager, workshop supervisor, surveyor/setter out, draftsman/CAD operator, marker out, machinist, bench joiner, estimator, CNC programmer, CNC operator.

Documents
Risk assessments, work restrictions, method statement, production plans, authorised operator lists, legislation.

Information sources
working drawings, job sheets, specifications, schedules, technical and manufacturers' information, Building Regulations, patterns, cutting lists.

Joinery products (2.3)
Doors, door and window frames, staircases, linings, units, mouldings (skirting, architraves, dado).

Methods
Drawings match each other, match requirements (ironmongery requirements, Building Regulations), measurements given on the drawings match the existing work and the customer's requirements.

Discrepancies
measurement errors, incorrect drawing details, design issues.

Component parts (2.6)

Frames and linings: heads, cills, jambs, transoms, mullions.
Doors and sashes: stiles, rails (bottom, middle, top, frieze intermediate), glazing bars, meeting rails, muntins, panels, glazing beads, bed and bolection mouldings.
Stairs: strings, treads, risers, string cappings, balusters, newels, hand rails, nosings, wedges, glue blocks.
Units: ends, sides, shelves, tops, standards/end panels, plinths, rails (top, front, fascia), divisions, drawers, back panels, doors, posts.

Joinery products (2.6)
Doors, door and window frames, staircases, linings, units .

Component parts (2.7)
Frames: heads, cills, jambs, transoms, mullions.
doors and sashes: stiles, rails (bottom, middle, top, frieze intermediate), glazing bars, meeting rails, muntins, panels, glazing beads, bed and bolection mouldings.
Stairs: treads, string cappings, hand rails, nosings.

Joints
Mortice and tenon (haunched, long and short shoulder, double, scribed),finger, halving (cross, tee), widening (tongue and groove, loose tongue, butt, reversible glue joint, biscuit, dowel), housing (through, stopped, tongued), dovetail (through and lapped), comb.

Joinery products (2.8)
Doors, door and window frames, staircases, linings, units.

Learning outcome
The learner will: 3. know how to mark out for joinery products.
Assessment criteria
The learner can: 3.1 identify **tools** and **information sources** required for marking out for joinery components 3.2 state the purpose of using face side and face edge marks 3.3 state **methods** of marking out joints and sections on timber components.

Range
Tools Mortice gauge, marking gauge, try square, combination square, sliding bevel, box square, tape measure, rule. **Information sources** Setting out rod, cutting list. **Methods** use of patterns, templates, marking in pairs, minimisation of waste, removal of defects within sections.

Learning outcome
The learner will: 4. know how to plan for safe machining operations.
Assessment criteria
The learner can: 4.1 state the **requirements** of a wood machining environment 4.2 state the operations that can be carried out on **woodworking machines** 4.3 state the machining order for producing joinery components.

Range
Requirements Efficient machine shop layout, non-slip flooring, dust extraction, good house-keeping, appropriate lighting, appropriate temperature **Woodworking machines** Sawing, planing, jointing, profiling, finishing.

Unit 201 Health, safety and welfare in construction

Level:	5
Credit value:	7
Aim:	The aim of this unit is to provide the learner with the knowledge to carry out safe working practices in construction, in relation to sourcing relevant safety information and using the relevant safety procedures at work

Learning outcome
The learner will: 1. know the health and safety regulations, roles and responsibilities
Assessment criteria
The learner can: 1.1 identify **health and safety legislation** relevant to and used in the construction environment 1.2 state **employer and employee responsibilitie**s under the Health and Safety at Work Act (HASWA) 1.3 state **roles and responsibilities** of the Health and Safety Executive (HSE) 1.4 identify **organisations** providing relevant health and safety information 1.5 state the importance of holding on-site safety inductions and toolbox talks.

Range
Health and safety legislation Health and Safety at Work Act, Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), Control of Substances Hazardous to Health (COSHH), Construction, Design and Management (CDM) regulations , Provision and Use of Work Equipment Regulations (PUWER), manual handling operations Regulations, Personal Protective Equipment (PPE) at Work Regulations, Work at Height Regulations, Control of Noise at Work Regulations, Control of Vibration at Work Regulations , Electricity at Work Regulations, Lifting operations and Lifting Equipment Regulations (LOLER) **Employer responsibilities** Safe working environment, adequate staff training, health and safety information, site inductions, toolbox talks, risk assessment, supervision, PPE, reporting hazards, accidents and near misses, sections 2 to 9 of

Health and Safety at Work Act, CDM reg's, construction phase plans, welfare, display public liability Insurance and health and safety law poster.

Employee responsibilities

Working safely, working in partnership with the employer, reporting hazards, accidents and near misses, following organisational procedures as per Sections 2 to 9 of Health and Safety at Work Act.

Roles and responsibilities:

Enforcement (including fees for intervention), legislation and advice, inspection, investigation eg site investigations.

Organisations

Health and Safety Executive (HSE) website, Institute of Occupational Safety and Health, British Safety Council, 'manufacturer', ROSPA.

Learning outcome
The learner will: 2. know accident and emergency reporting procedures and documentation
Assessment criteria
The learner can: 2.1 state legislation used for reporting accidents 2.2 state major **types of emergencies** that could occur in the workplace 2.3 identify reportable injuries, diseases and dangerous occurrences as per RIDDOR 2.4 state main types of **records** used in the event of an accident, emergency and near miss and reasons for reporting them 2.5 identify **authorised personnel** involved in dealing with accident and emergency situations 2.6 state **actions** to take when discovering an accident.

Range

Types of emergencies

Fires, security incidents, gas leaks.

Records:

Accident book, first aid records, organisational records and documentation.

Authorised personnel

First aiders, supervisors/managers, health and safety executive, emergency services, safety officer.

Actions

Area made safe, call for help, emergency services.

Learning outcome
The learner will: 3. know how to identify hazards in the workplace
Assessment criteria
The learner can: 3.1 state the importance of **good housekeeping** 3.2 state reasons for risk assessments and method statements 3.3 identify **types of hazards** in the workplace 3.4 state the importance of the correct storage of combustibles and chemicals on site 3.5 identify different **signs and safety notices** used in the workplace.

Range
Good housekeeping: Cleanliness, tidiness, use of skips and chutes, segregation of materials, clear access to fire escapes, clear access to fire extinguishers. **Types of hazards:** Fires, slips, trips and falls, hazardous substances (relating to inhalation, absorption, exposure, ingestion, cross-contamination), electrical, asbestos, manual handling, plant and vehicle movement, adverse weather. **Signs and safety notices:** Prohibition, mandatory, warning, safe condition, supplementary.

Learning outcome
The learner will: 4. know about health and welfare in the workplace
Assessment criteria
The learner can: 4.1 identify requirements for welfare facilities in the workplace as per Construction Design Management (CDM) 4.2 state health effects of noise and **precautions** that can be taken 4.3 state **risks** associated with drugs, alcohol and medication which could affect performance in the workplace.

Range
Precautions Reducing noise at source, PPE, isolation, exposure time. **Risks** Reduced risk perception, loss of concentration, balance problems, absenteeism and reduced productivity.

Learning outcome
The learner will: 5. know how to handle materials and equipment safely
Assessment criteria
The learner can: 5.1 identify legislation relating to safe handling of materials and equipment 5.2 state procedures for safe lifting and manual handling activities in accordance with guidance and legislation 5.3 state the importance of using **lifting aids** when handling materials and equipment.

Range
Lifting aids Wheelbarrow, sack barrow, mechanical lifting aids, pallet truck.

Learning outcome
The learner will: 6. know about access equipment and working at heights
Assessment criteria
The learner can: 6.1 identify legislation relating to working at heights 6.2 identify types of **access equipment** 6.3 state **safe methods** of use for **access equipment** 6.4 identify **dangers** of working at height.

Range
Access equipment: Stepladders, ladders (pole, extension), trestles, hop-ups, proprietary scaffolding, podium, stilts **Safe methods** Regular inspection, check for broken, damaged or missing components, responsible use, consideration of adverse weather conditions, good housekeeping **Dangers** Falling tools, falling equipment, falling materials, persons falling from height (injuries to themselves and others).

Learning outcome
The learner will: 7. know how to work with electrical equipment in the workplace
Assessment criteria
The learner can: 7.1 state **precautions** to take to avoid risks to self and others when working with electrical equipment 7.2 state **dangers** of using electrical equipment 7.3 identify **voltages** and voltage colour coding that are used in the workplace 7.4 state **methods** of storing electrical equipment.

Range
Precautions Check leads, check plugs, use of cable hangers, check tools and equipment, current valid PAT certificate **Dangers**: Burns, electrocution, fire. **Voltages** Battery powered, 110/115 volts, 230/240 volts and 415 volts. **Methods** Components present, equipment cleaned, checked for damage, stored in a clean and secure location.

Learning outcome
The learner will: 8. know how to use Personal Protective Equipment (PPE)
Assessment criteria
The learner can: 8.1 state the legislation governing use of Personal Protective Equipment (PPE) 8.2 state **types of PPE** used in the workplace 8.3 state the importance of PPE 8.4 state why it is important to store, maintain and use PPE correctly 8.5 state the importance of checking and reporting damaged PPE.

Range
PPE: Head protection, eye protection, ear protection, face/dust masks, breathing apparatus, high visibility clothing, safety footwear, gloves, sun protection, barrier cream, water proofs, knee pads, overalls/disposable clothing

Learning outcome
The learner will: 9. know the cause of fire and fire emergency procedures
Assessment criteria
The learner can: 9.1 state **elements** essential to creating a fire 9.2 identify methods of fire prevention 9.3 state actions to be taken on discovering a fire 9.4 state **types of fire extinguishers** and their uses.

Range
Elements Oxygen, fuel, heat. **Types of fire extinguishers:** Water, foam, CO2, dry powder.

Unit 262 Setting and operating fixed sawing machines

Level:	5
Credit value:	8
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate fixed sawing machines.

Learning outcome
The learner will: 1. know the principles of using sawing machines safely.
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to sawing machines 1.2 state **operations** carried out on **sawing machines** 1.3 identify **components** of sawing machines 1.4 describe **pre-start checks** in relation to sawing machines 1.5 state dust extraction requirements for sawing machines 1.6 describe **safety aids** and **features** of sawing machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), approved code of practice (ACoP), Health and Safety at work act, personal protective equipment at work (PPE), control of substances hazardous to health (COSHH), control of noise at work regulations, environmental regulations. **Operations** Dimensioning, trenching, mitre/compound cuts, bevelling, shaped cuts, saddle and jig work. **Sawing machines** Cross cut (radial arm, pullover type, travelling head), circular rip, dimension (wall and table), panel, narrow bandsaw, band re-saw. **Components** Guards (top/bottom, pressure, crown/top), extraction points, fences, riving knife, bed, blade, information plate, mouth piece, packings, finger plate, machine controls, adjusting mechanisms, scoring saw, thrust wheels, guides, tensioning and tracking adjustment. **Pre-start checks**

Missing or damaged or incorrectly fitted guards, faulty or incorrectly fitted tooling and damage to equipment, riving knife (thickness, distance, height), debris in work area, correct blade tension, correct tracking, guide assembly correctly adjusted, report any faults to supervisor, scoring saw position, fence position.

Safety aids

Push sticks, jigs (saddle, wedge), false fence.

Features

Crown/top saw guard, riving knife, braking systems, isolation switch, outfeed table, power-feed, roller support, tables, wedge, safety interlocks.

Learning outcome
The learner will: 2. know how to change blades for sawing machines.
Assessment criteria
The learner can: 2.1 calculate minimum saw blade diameters for safe operation 2.2 identify the different **characteristics** of **blades** for sawing machines 2.3 identify **parts** of saw blades 2.4 state the sequence of changing blades for **sawing machines** 2.5 state the handling and storage requirements for saw blades.

Range
Characteristics Tooth geometry (top bevel type, positive, negative and neutral), tooth set (skip, swage, spring set), cutting action (crosscut, rip, combination), material (high speed steel, stellite, tungsten carbide tipped), expansion slots, noise reduction design. **Blades** Circular, band. **Parts** Root, top, face, back, point, heel, hook, gullet, tip, kerf. **Sawing machines** Cross cut, circular rip, dimension (wall and table), bandsaw (narrow and wide, including position, tracking and tension).

Learning outcome
The learner will: 3. be able to change blades on sawing machines.
Assessment criteria
The learner can: 3.1 carry out risk assessment for changing saw blades 3.2 select the type of saw blade for the operation being carried out

3.3	change **saw blades** using appropriate tools in accordance with manufacturer's instructions
3.4	set saw blade position according to given specification
3.5	carry out pre-start checks
3.6	follow current environmental and relevant health and safety legislation relating to changing saw blades.

Range
Saw blades Circular, narrow band.

Learning outcome
The learner will: 4. understand how to set up and operate sawing machines.
Assessment criteria
The learner can: 4.1 state **information** contained in a cutting list 4.2 describe the **adjustments** made to sawing machines 4.3 describe how to cut materials efficiently 4.4 state **methods** of cutting materials safely to given specifications.

Range
Information Description of the item, quantity, material, length, width, thickness (sawn and planed), remarks, contract details, requirements according to current legislation and approved code of practice. **Adjustments** Appropriate blade height, appropriate angle, positioning of guards and fences in relation to saw blades and materials, guide assembly. **Methods** Cutting speeds, in-feeding of materials, position of materials to fence, feed speed, outfeed support, use of jigs and templates for straight and curved cuts, push sticks.

Learning outcome
The learner will: 5. be able to set up and operate sawing machines.
Assessment criteria
The learner can: 5.1 carry out risk assessment for cutting operations 5.2 adjust saw blades, guards and fences to given specification 5.3 carry out pre-start checks 5.4 cut materials to given cutting list 5.5 follow current environmental and relevant health and safety legislation relating to cutting operations.

Unit 262 Setting and operating fixed sawing machines

Supporting information

Guidance

The unit contains two assessment criteria in relation to carrying out pre-start checks (Assessment Criteria 3.5 and 5.3). It is expected that learners should be able to carry out these checks both after changing saw blades **and** before operating a machine (regardless of whether saw blades have been changed or not).

Unit 263 Setting and operating fixed planing machines

Level:	5
Credit value:	7
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate fixed planing machines.

Learning outcome
The learner will: 1. know the principles of using planing machines safely.
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to planing machines 1.2 state **operations** carried out on **planing machines** 1.3 identify **components** of planing machines 1.4 describe **pre-start checks** in relation to planing machines 1.5 state dust extraction requirements for planing machines 1.6 describe **safety aids** and **features** of planing machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), Approved Code of Practice (ACoP), Health and Safety at Work etc Act, Personal Protective Equipment at Work (PPE), Control of Substances Hazardous to Health (COSHH), Control of Noise at Work Regulations, Environmental Regulations, Abrasive Wheel Regulations. **Operations** Facing, edging, bringing to size, tapering, bevelling. **Planing machines** Surfacer, thicknesser, combination, four-sided. **Components** Guards (bridge guard, shaw guard, electrically interlocked hoods and enclosures), extraction points, fences, bed, knives, information plate, machine controls, adjusting mechanisms, through feed rollers, anti-kickback fingers, pressure bars, sectional rollers, anti-friction rollers. **Pre-start checks**

Missing or damaged or incorrectly fitted guards, faulty, incorrectly fitted or incorrectly set tooling, damage to equipment, extraction ports open, debris in work area, report any faults to supervisor, position of feed rollers.

Safety aids

Jigs, pushblock, saddles, push sticks.

Features

Braking systems, isolation switch, power-feed, roller support tables, anti-kickback fingers, safety interlocks, feed rollers.

Learning outcome
The learner will: 2. know how to change cutter knives for planing machines.
Assessment criteria
The learner can: 2.1 identify **factors** that affect cutter pitch 2.2 identify types of **cutter knife** for planing 2.3 identify types of knife securing mechanisms 2.4 state the sequence of changing cutter knives for planing machines 2.5 state the handling and storage requirements for cutter knives.

Range
Factors Feed speed, number of knives, cutter block speed. **Cutter knife** Slotted, reversible/disposable, serrated back cutters.

Learning outcome
The learner will: 3. be able to change cutter knives on planing machines.
Assessment criteria
The learner can: 3.1 carry out risk assessment for changing cutter knives 3.2 select the type of cutter knives for the block in use 3.3 change cutter knives using appropriate tools in accordance with manufacturer's instructions 3.4 reset machine tables 3.5 carry out pre-start checks 3.6 follow current environmental and relevant health and safety legislation relating to changing cutter knives.

Learning outcome
The learner will: 4. understand how to set up and operate planing machines.
Assessment criteria
The learner can: 4.1 describe the **adjustments** made to planing machines 4.2 describe how to plane materials efficiently 4.3 state **methods** of planing materials safely to given specifications.

Range
Adjustments Depth of cut, angle, thickness, out-feed table, feed speed, anti-friction rollers, guards and fences. **Methods** Cutting speeds, in-feeding of materials, position of materials to fence, feed speed, out-feed support, use of jigs, push blocks, planing with the grain, selection of appropriate tooling (Tungsten Carbide Tipped (TCT), High Speed Steel (HSS)).

Learning outcome
The learner will: 5. be able to set up and operate planing machines.
Assessment criteria
The learner can: 5.1 carry out risk assessment for planing operations 5.2 adjust feed speeds, guards and fences to given specification 5.3 carry out pre-start checks 5.4 produce planed components to given specification 5.5 follow current environmental and relevant health and safety legislation relating to planning operations.

Unit 263 Setting and operating fixed planing machines

Supporting information

Guidance

The unit contains two assessment criteria in relation to carrying out pre-start checks (Assessment Criteria 3.5 and 5.3). It is expected that learners should be able to carry out these checks both after changing cutter knives **and** before operating a machine (regardless of whether cutter knives have been changed or not).

Unit 264 Setting and operating fixed jointing machines

Level:	5
Credit value:	7
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate fixed jointing machines.

Learning outcome
The learner will: 1. know the principles of using jointing machines safely.
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to jointing machines 1.2 state **operations** carried out on **jointing machines** 1.3 identify **components** of jointing machines 1.4 describe **pre-start checks** in relation to jointing machines 1.5 state dust extraction requirements for jointing machines 1.6 describe **safety aids** and **features** of jointing machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), Approved Code of Practice (ACoP), Health and Safety at Work etc Act, Personal Protective Equipment at Work (PPE), Control of Substances Hazardous to Health (COSHH), Control of Noise at Work Regulations, Environmental Regulations, Abrasive Wheel Regulations. **Operations** Morticing, tenoning, scribing, trenching, dovetailing. **Jointing machines** Chain and chisel morticer, single-ended tenoner, double-ended tenoner, dovetailer, spindle moulder. **Components** Guards (pressure, false fences, finger fences), extraction points, fences, bed, knives, blocks, machine controls, adjusting mechanisms, holding devices, tensioning bar, chip breaker, depth stops. **Pre-start checks**

Missing or damaged or incorrectly fitted guards, faulty or incorrectly fitted tooling and damage to equipment, extraction ports open, debris in work area, report any faults to supervisor, correct tooling speed.

Safety aids
Saddles, tilting piece.

Features
Guards, braking systems, isolation switch, roller support, tables, safety interlocks, holding devices, false beds, false fences, backing fence/saddle.

Learning outcome
The learner will: 2. know how to change tooling for jointing machines.
Assessment criteria
The learner can: 2.1 identify types of **tooling** for jointing machines 2.2 identify **component parts** of tooling 2.3 state the sequence of changing tooling for **jointing machines** 2.4 state the handling and storage requirements for tooling.

Range
Tooling Chisel, cutter heads and blocks, chains, cut off saw, tenoning head. **Component parts** Chisels, augers, chains, chain bars, sprockets, bushes/collars and collets, chuck, knives, shoulder and scribing cutters. **Jointing machines** Chain and chisel morticer, single-ended tenoner, double-ended tenoner dovetailer, spindle moulder.

Learning outcome
The learner will: 3. be able to change tooling for jointing machines.
Assessment criteria
The learner can: 3.1 carry out risk assessment for changing tooling 3.2 select tooling for the operation being carried out 3.3 change tooling using appropriate tools in accordance with manufacturer's instructions 3.4 carry out pre-start checks 3.5 follow current environmental and relevant health and safety legislation relating to changing tooling.

Learning outcome
The learner will: 4. understand how to set up and operate jointing machines.
Assessment criteria
The learner can: 4.1 describe the **adjustments** made to **jointing machines** 4.2 state **methods** of jointing materials safely to given specifications.

Range
Adjustments Height, projection, auger clearance, head and block vertical/horizontal positioning, guards, cramping devices, fences, length stops, depth stop, position to marking out/gauge lines, cut off saw. **Jointing machines** Chain and chisel morticer, single-ended tenoner, double-ended tenoner dovetailer, spindle moulder. **Methods** Use of test pieces, false fences, backing fences, saddles, tilting pieces, use of stops, roller support/stand.

Learning outcome
The learner will: 5. be able to set up and operate jointing machines.
Assessment criteria
The learner can: 5.1 carry out risk assessment for jointing operations 5.2 adjust jointing machines to produce joints to given specification 5.3 adjust guards and cramping 5.4 carry out pre-start checks 5.5 produce jointed components 5.6 follow current environmental and relevant health and safety legislation relating to jointing operations.

Unit 264 Setting and operating fixed jointing machines

Supporting information

Guidance

The unit contains two assessment criteria in relation to carrying out pre-start checks (Assessment Criteria 3.4 and 5.4). It is expected that learners should be able to carry out these checks both after changing tooling **and** before operating a machine (regardless of whether tooling has been changed or not).

Unit 265 Setting and operating fixed profiling machines

Level:	5
Credit value:	8
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate fixed profiling machines.

Learning outcome
The learner will: 1. know the principles of using profiling machines safely.
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to profiling machines 1.2 state **operations** carried out on **profiling machines** 1.3 identify **components** of profiling machines 1.4 describe **pre-start checks** in relation to profiling machines 1.5 state dust extraction requirements for profiling machines 1.6 describe **safety aids** and **features** of profiling machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), approved code of practice (ACoP), Health and Safety at work act, personal protective equipment at work (PPE), control of substances hazardous to health (COSHH), control of noise at work regulations, environmental regulations. **Operations** Rebating, grooving, bevelling, moulding/profiling, end/edge jointing, chamfers, trenching, shaping. **Profiling machines** Spindle moulders, overhead routers, through-feed moulders. **Components** Guards (bonnet, cage, hood, pressure, false fences, finger fences, electrically interlocked enclosures), extraction points, fences, bed, machine controls, adjusting mechanisms, guides, table rings, sliding table, compound table, spindle, spacing rings, collets, pins, mechanical feed, foot treadle, turret/depth stops, mechanical break, frequency changer. **Pre-start checks**

Missing or damaged or incorrectly fitted guards, faulty or incorrectly fitted tooling and damage to equipment, correct air pressure, extraction ports open, correct frequency selected, debris in work area, report any faults to supervisor, correct cutter speeds.

Safety aids

Push sticks, jigs, push blocks, spikes, feather boards.

Features

Safety interlocks, braking systems, isolation switch, out-feed table, power-feed, roller support, tables.

Learning outcome
The learner will: 2. know how to change tooling for profiling machines.
Assessment criteria
The learner can: 2.1 identify **information sources** on tooling for profiling 2.2 describe types of **tooling** for profiling machines 2.3 identify types of **cutter profiles** 2.4 state the sequence of changing tooling for **profiling machines** 2.5 state the handling and storage requirements for tooling.

Range
Information sources Manufacturers' instructions (manual/power feed, tooling speeds), specifications, drawings, setting out rods, manufacturers' catalogues. **Tooling** Solid profile blocks, removable, disposable, limited projection tooling, router cutters (fluted, panel, profile), serrated, Tungsten Carbide Solid/Tipped (TCT), High Speed Steel (HSS), Polycrystalline Diamond (PCD). **Cutter profiles** Ovolo, torus, bullnose, chamfer, bevelled, ogee, grooving, rebated. **Profiling machines** Spindle moulders, overhead routers, through-feed moulders.

Learning outcome
The learner will: 3. be able to change tooling on profiling machines.
Assessment criteria
The learner can: 3.1 carry out risk assessment for changing tooling 3.2 select the type of tooling for the operation being carried out 3.3 change tooling using appropriate tools in accordance with manufacturer's instructions 3.4 carry out pre-start checks 3.5 follow current environmental and relevant health and safety legislation relating to changing tooling.

Learning outcome
The learner will: 4. understand how to set up and operate profiling machines.
Assessment criteria
The learner can: 4.1 state **information** required to produce profiles 4.2 describe the **adjustments** made to profiling machines 4.3 describe how to profile materials efficiently 4.4 state **methods** of profiling materials safely to given specifications.

Range
Information Patterns, marking out, drawings, specifications, manufacturer's catalogue, setting out rod. **Adjustments** Appropriate height, appropriate angle, depth of cut, feed speeds, fences, guards, false fences, hood, finger fence, ring fence, bonnet guard, top and side pressures, table rings, holding devices, stops, frequency selection, spindle speed. **Methods** In-feeding of materials, position of materials to fence, out-feed support, use of jigs, templates and back stops for straight, curved and stopped work, packing pieces for staged cuts, use of feather boards and false fences, fence stops.

Learning outcome
The learner will: 5. be able to set up and operate profiling machines.
Assessment criteria
The learner can: 5.1 carry out risk assessment for profiling operations 5.2 set up profiling machine to given specification

5.3	carry out pre-start checks
5.4	produce trial cuts safely
5.5	produce profiled materials to given specification
5.6	follow current environmental and relevant health and safety legislation relating to profiling operations.

Unit 265 Setting and operating fixed profiling machines

Supporting information

Guidance

The unit contains two assessment criteria in relation to carrying out pre-start checks (Assessment Criteria 3.4 and 5.3). It is expected that learners should be able to carry out these checks both after changing tooling **and** before operating a machine (regardless of whether tooling has been changed or not).

Unit 266 Setting and operating fixed sanding machines

Level:	2
Credit value:	6
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate fixed sanding machines.

Learning outcome
The learner will: 1. Know the principles of using sanding machines safely
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to sanding machines 1.2 state **operations** carried out on **sanding machines** 1.3 identify **components** of sanding machines 1.4 describe **pre-start checks** in relation to sanding machines 1.5 state dust extraction requirements for sanding machines 1.6 describe **safety aids** and **features** of sanding machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), approved code of practice (ACoP), Health and Safety at work act, personal protective equipment at work (PPE), control of substances hazardous to health (COSHH), control of noise at work regulations, environmental regulations. **Operations** Sanding, shaping, thicknessing, profiling. **Sanding machines** Wide belt, narrow belt, disc, bobbin, profile. **Components** Abrasives (belt, disc, roll), guards (pressure), extraction points, fences, bed, machine controls, adjusting mechanisms, guides, tensioning, sliding table, spindle, mechanical feed, discs, drums, sensors, interlocks, setting devices, measuring devices, pneumatic tensioning devices. **Pre-start checks** Damaged/worn abrasives, correctly fitted abrasives, correct pneumatic pressures, missing/damaged/incorrectly fitted guards, debris in work area,

extraction, correct dimensional settings, feed belt condition, report any faults to supervisor.

Safety aids
Push sticks, jigs, push blocks, hand pressure pad.

Features
Safety interlocks, limit switch, braking systems, isolation switch, out-feed table, roller support, tables.

Learning outcome
The learner will: 2. know how to change abrasives for sanding machines.
Assessment criteria
The learner can: 2.1 identify **information sources** on abrasives for sanding 2.2 describe different types of **abrasive material** used for sanding machines 2.3 identify appropriate grit grades for sanding operations 2.4 state the sequence of changing abrasives for **sanding machines** 2.5 state the handling and storage requirements for abrasive materials.

Range
Information sources Machine manufacturers' information, abrasives manufacturers' information (rotation direction and grit size), specifications, back of the belt (rotation direction and grit size). **Abrasive material** Mineral, ceramic, aluminium oxide, silicon carbide, garnet, paper, cloth, open coat, closed coat, antistatic properties. **Sanding machines** Wide belt, narrow belt, disc, bobbin, profile.

Learning outcome
The learner will: 3. be able to change abrasives on sanding machines.
Assessment criteria
The learner can: 3.1 carry out risk assessment for changing abrasives 3.2 select the type of abrasive for the operation being carried out 3.3 change abrasives using appropriate methods in accordance with manufacturer's instructions 3.4 carry out pre-start checks 3.5 follow current environmental and relevant health and safety legislation relating to changing abrasives.

Learning outcome
The learner will: 4. understand how to set up and operate sanding machines.
Assessment criteria
The learner can: 4.1 describe the **adjustments** made to sanding machines 4.2 state **methods** of sanding materials safely to given specifications 4.3 state **methods** of using sanding machines efficiently 4.4 identify **problems** that can occur during sanding.

Range
Adjustments Appropriate height, appropriate angle, feed speeds, fences, guards, top and side pressures, holding devices, stops, dimension settings, belt tracking. **Methods (4.2)** In-feeding of materials, position of materials to fence, out-feed support, use of jigs and holding devices for straight and shaped work. **Methods (4.3)** Maintaining cutting efficiency of abrasives, removal of sanding dust with vacuum cleaners, efficient machine loading (for wide belt sanders), use of abrasive cleaning stick. **Problems** Machine malfunction, detached disc, clogging, tearing and shredding of abrasive materials, burning, snaking, glazing, ejection of material.

Learning outcome
The learner will: 5. be able to set up and operate sanding machines.
Assessment criteria
The learner can: 5.1 carry out risk assessment for sanding operations 5.2 set up sanding machine to given specification 5.3 carry out pre-start checks 5.4 carry out sanding to given specification 5.5 follow current environmental and relevant health and safety legislation relating to sanding operations.

Unit 266 Setting and operating fixed sanding machines

Supporting information

Guidance

The unit contains two assessment criteria in relation to carrying out pre-start checks (Assessment Criteria 3.4 and 5.3). It is expected that learners should be able to carry out these checks both after changing abrasives **and** before operating a machine (regardless of whether abrasives have been changed or not).

Unit 267 Setting and operating NC/CNC machines

Level:	5
Credit value:	7
Aim:	The aim of this unit is to provide the learner with the knowledge and skills to set and operate NC/CNC machines.

Learning outcome
The learner will: 1. know the principles of using NC/CNC machines safely.
Assessment criteria
The learner can: 1.1 describe the requirements of **current legislation** applicable to NC/CNC machines 1.2 state **operations** carried out on **NC/CNC machines** 1.3 identify **NC/CNC-specific components** 1.4 describe **pre-start checks** in relation to NC/CNC machines 1.5 state dust extraction requirements for NC/CNC machines 1.6 describe **safety aids** and **features** of NC/CNC machines.

Range
Current legislation Provision and Use of Work Equipment Regulations (PUWER), approved code of practice (ACoP), Health and Safety at work act, personal protective equipment at work (PPE), control of substances hazardous to health (COSHH), control of noise at work regulations, environmental regulations. **Operations** Profiling, shaping, planing, jointing, sawing, optimised cutting, boring, sanding edgebanding. **NC/CNC machines** Machining centres, routers, tenoners, beam saws, panel/cross cut saws, multi-boring machines, through feed moulding machines, spindle moulders, cutter template makers, lathe, sanders and edgebanders. **NC/CNC-specific components** Computer, hard drive, Visual Display Unit (VDU), digital readout, matrix table, vacuum pods, tool store, adjustable stops, keyboard. **Pre-start checks**

Correct pneumatic pressures, correct position of pneumatic clamping devices, missing/damaged/incorrectly fitted guards, debris in work area, extraction, correct program selection, correct holding device, correct tooling, correct tooling speeds, tool path simulation, program proving, sufficient vacuum seal, maintenance schedule adhered to, report any faults to supervisor.

Safety aids

Feeding and holding devices, push sticks, jigs, push blocks.

Features

Safety interlocks, limit switch, braking systems, isolation switch, out-feed table, roller support, tables, power feeds, pressure mats, double push button operation.

Learning outcome
The learner will: 2. understand how to set up and operate NC/CNC machines.
Assessment criteria
The learner can: 2.1 state the **set up sequence** for NC/CNC machines. 2.2 state the **sequence of operating** NC/CNC machines. 2.3 identify **problems** that can occur during the operation of NC/CNC machines.

Range
Set up sequence Correct isolation procedure/use of safe condition, select appropriate program, check materials against program, setup vacuum table/pods, feeding and holding devices to suit components to be machined, adjust stops to locate position of components, confirm correct tooling, confirm calibration of machine axis if applicable, safely load/feed workpieces, turn on local exhaust ventilation. **Sequence of operating** Accurate positioning of components, activate vacuum/clamping device/feed mechanism, activate machine cycle/feed workpieces, safely unload materials (CNC router), check component against specification. **Problems** Vacuum failure, program error, incorrect program selection, incorrect tool selection, inaccurate positioning of components, incorrect position of pods or holding devices, incorrect feed settings, damaged or blunt cutters, incorrect component finish.

Learning outcome
The learner will: 3. be able to set up and operate NC/CNC machines.
Assessment criteria
The learner can:

3.1	carry out risk assessment for using NC/CNC machines
3.2	set up NC/CNC machines to given specification
3.3	carry out pre-start checks
3.4	operate NC/CNC machines to produce components to given specification
3.5	follow current environmental and relevant health and safety legislation relating to the use of NC/CNC machines.

Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for e-assessments.

City & Guilds

Believe you can

www.cityandguilds.com

Useful contacts

International learners General qualification information	E: **intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	E: **centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	E: **singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	E: **intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	E: **walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	E: **business@cityandguilds.com**
Publications Logbooks, Centre documents, Forms, Free literature	

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

Published by City & Guilds, a registered charity established to promote education and training

City & Guilds
1 Giltspur Street
London EC1A 9DD
www.cityandguilds.com