CARPENTRY & JOINERY

TWO YEAR COURSE

LEADING TO THE

INSTITUTE OF CARPENTERS

INTERMEDIATE EXAMINATION

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INTRODUCTION TO THE COURSE

This course is designed and constructed for students who wish to study the craft of Carpentry and Joinery. The course is for a period of two years after which it is envisaged that the student will attain the Institute of Carpenters Intermediate examination.
Lecturers must be aware however that the students attending on the course may not be working in the trade or may be unemployed, so the Lecturer teaching on the course may find that they will need to put in extra effort when teaching particular subjects.

By the end of the first year the students will have achieved the basic aspects of practical and theory subjects. At the end of this first year it may be advisable to check the students progress by an end of year examination based on the subjects covered so far, or alternatively, enter them for the Foundation examination.

Towards the end of the second year the students will enter for the **Institute of Carpenters Intermediate examination.** This exam is in two parts as follows:-

a **Paper One:** Craft skills competence - A practical test piece to be:-

1. Completed in a continuous period not exceeding four hours duration.

2. Comparable in standard to that at present in use.

3. To be set by the Institute.

Marking of the completed test is to be:-

1. Undertaken by the Examination Centre.

2. Conform to a marking schedule devised by the Board.

3. Fall within the relevant broad bending:-

Fail Pass Credit Distinction

b **Paper Two:** Associated Vocational Technology - A written paper to be:-

1. Attempted in a continuous period of time not exceeding one and a half hours duration.

2. Composed of 20 questions.

All answers shall:-

1. Carry equal marks.

2. Be submitted on the question paper provided.

3. Be short in nature (sketched, written, calculated, etc).

Marking shall be undertaken by the Institute and shall fall within the relevant broad banding:-

Fail Pass Credit Distinction

Following the publication of results, a Certificate of achievement will be issued to candidates listing only those components in which they were successful and stating the grade(s) of pass. All candidates will be notified of their achievement towards the required standard in the components for which they are registered.

It is of great importance that Lecturers follow the scheme of work and not miss out subjects they feel they have little experience of. Also only to teach the subjects and level indicated for that particular week and not in the first year of the course jump to subjects or levels that will be covered in the second year of the course. Any problems with the course content should be conferred with the course director as soon as possible.

After each theory lesson the subject covered is to be entered in the **"Record of work" book** provided by the course director. It is most important that this task is carried out. For two reasons, one is to provided any Lecturer standing in for an absent colleague an idea of the subjects covered, and two, the completed record book will pass onto the Lecturer teaching the second year part of the course.

The theory lesson should be divided into two parts with a possible short break in between. Some students may have come straight from work and have not had any refreshment. As the theory lessons are three hours in total it is for this reason each lesson has been designed to be one and a half hours long.

Finally some general notes especially for Lecturers teaching First year students.

1 Lessons should be planned to promote understanding of fundamental principles rather than over emphasise memory or factual subject matter.

2 At all stages, and particularly in the early weeks, students should have set for them high standards of draughtsmanship, lettering and, a proper pride in the production of neat accurate drawings and sketches.

3 It should not be necessary to remind Lecturers that during the first year's work the student will acquire skills and habits in drawing which will be reflected in all their whole career. Therefore, it is very important indeed that difficulties of EACH student are considered with a view to putting them on the right track from the very beginning. **NO** difficulty of **ANY** student at this stage is **TOO** small for the Lecturer to consider and to solve, e.g. sometimes it is worth getting the student to change the kind of pencil they are using because it is too hard or too soft for their particular hand and muscles.

4 It is intended that the teaching of theory of a particular craft shall provide the student with the opportunity of study of tools, materials and practices in a manner which is not possible in the workshop or on the building site, e.g. detailed comparison of similar tools or materials which would waste time in the workshop or on the site, can be very well be suited for teaching and discussion in the theory classroom. Whenever possible and desirable, the students should be encouraged to pursue their studies by means of drawing and sketching.

5 Maximum use should be made of British Standard Specifications, British Standards Codes of Practice, The current Building Regulations, together with manufacturers samples and catalogues as appropriate.

6 From time to time the students should be set homework to encourage self-study and improve on minor difficulties they may be having in a particular area.

Remember the students you are teaching will be the future Carpenters and Joiners, Site Agents, Trade Foremans, Architects, Contract Managers etc, or even **Lecturers.....**

IOC 1 THEORY 1.5 HOURS

year & syllabus reference

The course content will cover:-

1.4 **Wood trade calculations.**

1.7 **Hand tools.**

1.8 **Methods of timber jointing.**

1.11 **Safe use of portable power tools.**

1.12 **Safe use of woodworking machinery.**

1.13 **Different types of door constructions.**

1.14 **Methods of constructions for door frames and linings.**

1.15 **The production of casement windows.**

1.16 **Methods of construction for fitments to include free-standing and shelving units.**

1.17 **Staircase construction for straight flight.**

1.18 **The construction of timber floors.**

1.19 **Wall panelling.**

1.20 **Finishings.**

1.21 **The construction of Partitioning.**

1.22 **Roof construction.**

1.23 **Formwork.**

1.24 **Safe use of scaffolding.**

1.25 **Shoring.**

1.26 **The construction and use of arch centres.**

1.27 **Methods used for setting-out and levelling.**

1.28 **Repairs and Maintenance.**

1.7 Hand Tools

Week No

1	**1.7.1**	Introduction to the course. The examination structure.
	1.7.2	Describe the work of the Carpenter & Joiner.
	1.7.3	Differentiate between 1st & 2nd fixing.
	1.7.4	List a common tool-kit of a Carpenter & Joiner.
	1.7.5	Name & state the function of each hand tool.
	1.7.6	The selection of tools for specific purposes.

2	**1.7.7**	The care & maintenance of hand tools.
	1.7.8	Describe methods of sharpening hand tools.
	1.7.9	Explain the use of oil stones & slipstones.
	1.7.10	Describe methods of sharpening various plane irons, chisels & gouges.
	1.7.11	State the various grinding & sharpening angles.
	1.7.12	Understand the safe use of grinding wheels, regulations etc.
	1.7.13	Precautions to be observed when storing or guarding tools not in use.

1.8 Timber Jointing

Week No

3	**1.8.1**	State the reasons why timbers need to be jointed.
	1.8.2	Describe correct proportioning for joints.
	1.8.3	Describe the halving joint, cross, tee & dovetail.
	1.8.4	Mortice & tenon joint, including stub tenon, barefaced etc.
	1.8.5	Joints used to widen timbers, i.e. tongue & groove, loose tongue.

4	**1.8.6**	Machine edge joints.
	1.8.7	Slot screws.
	1.8.8	Dovetail joints.
	1.8.9	Biscuit jointing.
	1.8.10	Methods used for lengthening timbers to include scarf joints etc.

1.4 Wood trades calculations

5	**1.4.1**	Solve simple decimal problems of addition & subtraction.
	1.4.2	Solve simple decimal problems of multiplication & division.
	1.4.3	Calculate cost of materials from given prices.

1.11 Portable power tools

Week No

6 **1.11.1** State the safety precautions to be observed when using power tools.

1.11.2 Understand the purpose of using reduced voltage transformers.

1.11.3 Describe the use of transformers in the workshop or on site.

1.11.4 State the purpose of double insulation with 240 volt power tools.

1.11.5 Understand colour coding.

1.11.6 State the purpose of isolators.

1.11.7 Describe the safe use & application of:-

a) Drill in two speeds & percussion
b) Orbital sander
c) Belt sander

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7 **1.11.8** Describe the safe use & application of:-

a) Electric screwdriver
b) Jigsaw
C) Router
d) Circular saw
e) Planer

1.11.9 Explain the need for regular maintenance of power tools.

1.11.10 Describe the construction & use of simple jigs.

1.12 Woodworking machinery

Week No

8	**1.12.1**	Explain the purpose & requirements of related current safety regulations.
	1.12.2	State the purpose of isolating a machine when setting up or for maintenance.
	1.12.3	State the need for sharp cutting edges.
	1.12.4	Describe the safe use of the cross-cut saw to include travelling head & radial arm.
	1.12.5	Sketch the shape of the teeth for cross-cutting timber.
	1.12.6	Describe the size & types of saw blades available.
	1.12.7	Explain compound cutting.
	1.12.8	State the use of stops.

9	**1.12.9**	Describe the safe use of the hand fed circular saw.
	1.12.10	Explain the use of the crown guard, riving knife, packings etc.
	1.12.11	State the use of push sticks.
	1.12.12	Explain how splayed edges are sawn.
	1.12.13	Describe the cutting of wedges and glue blocks using jigs.
	1.12.14	Describe the safe use of the dimension saw.
	1.12.15	State the purpose of the travelling table.
	1.12.16	Explain how angles are cut by adjusting the fence or canting the saw.
	1.12.17	State the use of stops.

(Continued...)

Week No		
9 (Continued...)		
	1.12.18	Explain how "breaking out" can be prevented.
	1.12.19	State the use of push sticks and breaks.
10	**1.12.20**	Describe the safe use and setting up of the morticer.
	1.12.21	Explain the various parts & functions of the machine.
	1.12.22	Describe the changing of a chisel & auger bit.
	1.12.23	State the use of depth stops & table stops.
	1.12.24	Describe the safe use of the narrow band saw.
	1.12.25	Explain the various parts of the machine.
	1.12.26	Explain the safe setting up prior to use.
	1.12.27	State why the blade needs to be under tension.
	1.12.28	Describe the method of changing the blade and the method of tracking.
	1.12.29	Describe the use of jigs for cutting circular work etc.
1.4	**Wood trades calculations**	
11	**1.4.4**	Compile material specifications & cutting lists.
	1.4.5	Estimate quantities of materials including percentage for waste & vat.
	1.4.6	Evaluate simple costings with allowance for waste.

1.13 Doors

Week No

12	**1.13.1**	State the common sizes for doors.
	1.13.2	Describe & name the components of a ledge & battened door.
	1.13.3	State the need for allowance for movement.
	1.13.4	Name the components & construction of a framed ledge & braced door.
	1.13.5	Describe the methods used for forming the joints.
	1.13.6	Describe the methods used to protect the door for transport & storage.
	1.13.7	Explain the methods for fitting, hanging and finishing the door.

13	**1.13.8**	Describe the construction of a flush door.
	1.13.9	Describe the construction of a glazed door.
	1.13.10	Understand the machine processes used.
	1.13.11	Describe the need for long & short shoulders.
	1.13.12	Explain the need for scribes, machine & hand.
	1.13.13	Explain the need to protect the door for transport and storage.
	1.13.14	State the methods used for fitting, hanging and finishing the door.

1.14 Door frames & Linings (internal only)

Week No

14

1.14.1 State common size sections of materials & names of components.

1.14.2 Identify the types of joints used.

1.14.3 Describe the manufacturing processes.

1.14.4 Understand positioning of the tenon with regards to rebates, mouldings & grooves.

1.14.5 Describe long & short shoulders.

1.14.6 Understand machine & hand scribes.

1.14.7 Understand planted & stuck mouldings & door stops.

1.14.8 Describe the cramping up of the door frame/lining (braces etc) to include draw-bore pins.

1.14.9 Explain the method for checking the frame for square.

1.14.10 State the sequence for inserting the wedges.

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1.14.11 Explain why the frame is left long for transport to site.

1.14.12 Describe the sequence for fixing the door frame in the opening to include metal pins at the base of the jambs.

1.14.13 Describe the use of plumb-bob, water level, straight edge & packers etc.

1.14.14 Describe the types of fixings available.

1.14.15 Explain how the frame must be fitted straight & level to receive the door.

1.14.16 Explain how the frame can be protected on site prior to being used.

1.15 Casement windows

Week No

16	**1.15.1**	State the common size sections & component terms to include glazing bars.
	1.15.2	Understand the terms single, multiple light & traditional casements.
	1.15.3	Explain the terms side, top or bottom hung.
	1.15.4	Describe method of manufacture.

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	1.15.5	Explain the methods of fixing into an opening.
	1.15.6	Describe the use of dpc.
	1.15.7	List the ironmongery used.
	1.15.8	Describe the use of single & double glazing.

1.20 Finishings

18	**1.20.1**	Show common mouldings used.
	1.20.2	Describe the fixing of architraves around door & window openings.
	1.20.3	Explain the methods of jointing.
	1.20.4	Describe the jointing of two architraves of different widths.
	1.20.5	Explain the use of a mitre box & guillotine.
	1.20.6	Describe the method of scribing mouldings.

1.20 Finishings

Week No

19	**1.20.7**	State the purpose of skirtings.
	1.20.8	Name & describe common mouldings used..
	1.20.9	Explain internal and external jointing.
	1.20.10	Describe the methods used to scribe the skirting to an uneven floor.
	1.20.11	State the use of a mitre box.
	1.20.12	Explain the methods used to fix the skirting.
	1.20.13	Describe fitting and fixing of dado and picture rails.
	1.20.14	Explain jointing sections at inclined and horizontal situations.

1.16 Fitments (domestic free standing & built in)

20	**1.16.1**	Identify related elements & components.
	1.16.2	Describe the construction of a simple cupboard unit.
	1.16.3	State the materials used.
	1.16.4	List the ironmongery used.
	1.16.5	Explain methods of scribing to floor & wall, levelling & fixing.
	1.16.6	State types of finish coatings.
	1.16.7	Describe the construction of a simple shelving unit.
	1.16.8	State methods of fixing to solid & hollow walls.
	1.16.9	Describe methods of levelling. (Continued.....)

Week No

20 (Continued....)

1.16.10 Explain methods of adjustable shelving.

1.17.11 List ironmongery used.

1.16.12 State types of finish coatings.

1.17 Stairs (straight flight only)

21 **1.17.1** Explain terms and components used.

1.17.2 Show model examples.

1.17.3 Describe regulations affecting staircase construction.

1.17.4 Understand methods to obtain correct rise and goings.

1.17.5 Describe manufacture procedures.

1.4 Wood trades calculations

22 **1.4.7** Determine areas of a circle, triangle and trapeziums.

1.4.8 Calculate areas of a square and rectangle to include indents, i.e. floors with fireplaces etc.

1.4.9 Determine perimeters of a circle, rectangle & square.

1.4.10 Calculate floor coverings, i.e. carpet tiles, floor boarding, sheeting etc with given costings for materials.

1.18 Timber flooring (single ground floor only)

Week No

23	**1.18.1**	Explain the construction of a timber ground floor to include trimming for hearths.
	1.18.2	State the positioning and need for dpc and air bricks.
	1.18.3	Describe the purpose of the wall-plate.
	1.18.4	State the purpose of the Building regulations relating to ground floors.
	1.18.5	Describe the positioning & fixing of the floor joists & types of strutting.
	1.18.6	Describe the types of floor boarding used.
	1.18.7	Explain the cramping & fixing of the floor boarding.
	1.18.8	Describe the use of sheet boarding and fixing.
	1.18.9	Describe the protection of the floor during construction.

1.19 Wall panelling (dado height only)

24	**1.19.1**	State the purpose of wall panelling.
	1.19.2	Explain the purpose of using loose & framed grounds.
	1.19.3	Describe the fixing & levelling of the grounds.
	1.19.4	Describe the construction of framed panelling.
	1.19.5	Explain the joints at internal & external corners.
	1.19.6	Show methods of fixing to include secret fixing.
	1.19.7	Describe the construction of panelling around a recessed door & window opening.
	1.19.8	Describe different panel sections.

1.21 Partitions

Week No

25	**1.21.1**	State the purpose of erecting partitioning.
	1.21.2	Name & identify component parts.
	1.21.3	Describe the construction of a partition in-situ & pre-fabricated.
	1.21.4	Explain methods of forming openings & allowances for services etc.
	1.21.5	Describe methods of levelling & fixing.
	1.21.6	Describe the types of coverings used & methods of fixing.
	1.21.7	Explain types of finishes used around openings & at floor level.

1.22 Roofs (8m span single pitch to include gable ends only)

26	**1.22.1**	Identify components of the roof.
	1.22.2	Explain current building regulations.
	1.22.3	State the purpose of the wallplate.
	1.22.4	Describe the terms ridge, eaves, verges, abutments & gable ladder.
	1.22.5	Describe the setting out of the roof to include lean to, couple, close couple & collar.
	1.22.6	Explain methods of trimming for openings.
	1.22.7	Describe methods of ventilation.
	1.22.8	Explain methods of weathering the roof.

1.22 Roofs (8m span single pitch to include gable ends only)

Week No

27	**1.22.9**	Describe the construction of a flat roof.
	1.22.10	Understand current building regulations.
	1.22.11	Explain the setting out of a flat roof.
	1.22.12	Describe the construction of the eaves.
	1.22.13	Explain the trimming around openings etc.
	1.22.14	Describe the roof at abutments.
	1.22.15	Explain the fixing of roof covering & guttering.

1.23 Formwork (timber only)

28	**1.23.1**	Understand the terms in-situ & pre-cast.
	1.23.2	Explain the need for proper support.
	1.23.3	Explain the influence of fluid pressure on design.
	1.23.4	Describe the formwork for simple lintels, posts & cills in-situ & pre-cast.
	1.23.5	Explain the types, function and methods of application of release agents.
	1.23.6	Describe the erection, support, easing & striking for single & multi-use formwork.

1.4 Wood trades calculations

Week No

29	**1.4.11**	Calculate quantities in linear lengths, i.e. skirting, architrave etc.
	1.4.12	Determine cost of linear lengths from given price to include VAT & % for waste.
	1.4.13	Calculate superficial & cubic measurements from given examples.
	1.4.14	Determine cost of superficial & cubic measurement from given price to include VAT & % for waste.

1.24 Scaffolding (trestle, hop-ups, ladders & stepladders)

30	**1.24.1**	Recognise & state the function of commonly used components.
	1.24.2	Explain the safe use and current safety legislation associated with trestles, hop-ups, ladders & stepladders.
	1.24.3	Understand the need for inspection & safe storage of the above.

1.25 Shoring (timber dead shoring to two storey only)

31	**1.25.1**	Explain the purpose of dead shoring.
	1.25.2	State sizes of materials used.
	1.25.3	Name & describe the components used.
	1.25.4	Explain the erection of a dead shore to form an opening in an existing building.
	1.25.5	State the safety precautions that must be observed.
	1.25.6	Describe the dismantling procedure.

1.26 Centering (timber, max 2m span with 300mm wall)

Week No

32	**1.26.1**	Explain the use & purpose of arch centres.
	1.26.2	Describe the terms flat & segmental.
	1.26.3	Explain the construction of arch centres.
	1.26.4	Describe methods of propping & levelling.
	1.26.5	Describe methods of easing.
	1.26.6	Explain the types & functions of laggings.

1.27 Setting-out & Levelling

33	**1.27.1**	Explain the purpose of setting-out a site.
	1.27.2	Describe the function of Bench Marks.
	1.27.3	State the use & function of a datum line.
	1.27.4	Describe the use of a water level, including checking prior to use.

34	**1.27.5**	Describe the use of a spirit level, including checking prior to use.
	1.27.6	State other methods of checking for level including the plumb-bob.
	1.27.7	Describe the use of a straight edge, i.e. door linings etc.

1.28 Repairs and Maintenance

Week No

35	**1.28.1**	Understand the need for regular maintenance.
	1.28.2	State situations where faults could occur.
	1.28.3	Explain methods for removing defective architraves and skirtings.
	1.28.4	Describe methods for removing defective frames and linings.
	1.28.5	Understand the need for the safe disposal of defective components.

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36 **Foundation Examination.**

IOC 1 ASSOCIATED SUBJECTS

year & syllabus reference

The course content will cover:-

1.1 Materials.

1.2 Craft related drawing.

1.3 Timber related science.

1.5 Safety.

1.6 Protection, storage & safe handling.

1.9 Fixings.

1.10 Hardware & ironmongery.

1.29 Industrial Studies.

1.1 Materials

Week No

1	**1.1.1**	Explain the growth of a tree.
	1.1.2	Describe the different parts of a tree & their purposes.
	1.1.3	Explain the difference between hard & soft woods.
	1.1.4	Describe the identification & characteristics of softwoods to include Scots pine, European softwood, Douglas fir, Parana pine, Norway spruce, Hemlock, & Red cedar.

2	**1.1.5**	Describe the identification & characteristics of hardwoods to include Ash, Elm, Oak, Mahogany, Utile, Sapele, Teak, Iroko, Ramin, Afroromosia, & Beech.
	1.1.6	State uses for both hard & soft woods.

1.2 Craft related drawing

3 - 4	**1.2.1**	Exercise in use of British Standard Specification drawing practice.

1.1 Materials

5	**1.1.7**	Describe & illustrate different methods of timber conversion.
	1.1.8	State which methods are used to obtain surface grain patterns.
	1.1.9	Briefly describe the machines used.

1.3 Timber related science

Week No

6	**1.3.1**	State the reasons for seasoning timber.
	1.3.2	Describe the processes of air & kiln seasoning.
	1.3.3	Explain different methods to obtain correct moisture contents.
	1.3.4	State moisture content for different situations.

1.2 Craft related drawing

7	**1.2.2**	Describe the use & purpose of scale rules.
	1.2.3	State BS recommended scales for types of drawings.
	1.2.4	Exercise in the use of scales.

1.3 Timber related science

8	**1.3.5**	Describe the terms "Equilibrium Moisture Content" & "Fibre Saturation Point".
	1.3.6	Identify defects & degrading of timber resulting from seasoning.

1.2 Craft related drawing

9	**1.2.5**	Describe 1st & 3rd orthographic angle projection.
	1.2.6	Exercise in 1st angle orthographic projection of a small house.

1.3 Timber related science

Week No

10	**1.3.7**	Identify common timber growth defects & state the effects on usage & strength.

11	**1.3.8**	List the common types of woodworking adhesives in use to include PVA, Synthetic, Casein, Animal & Contact.
	1.3.9	Describe the ingredients of the above adhesives.
	1.3.10	Describe a use for each.
	1.3.11	Understand the need for safety precautions when using.
	1.3.12	Describe methods of application.
	1.3.13	Explain the terms "Pot life" & "shelf Life"

1.2 Craft related drawing

12	**1.2.7**	Describe the terms isometric & oblique.
	1.2.8	Explain & show examples where used.
	1.2.9	Exercise in isometric & oblique drawing using timber mouldings etc.

1.3 Craft related science

Week No

13	**1.3.14**	Explain the terms wet rot & dry rot.
	1.3.15	Describe the conditions required for wet & dry rot.
	1.3.16	Describe the life cycle of wet & dry rot.
	1.3.17	Identify wet & dry rot.
	1.3.18	Describe the treatment & eradication of wet & dry rot.

1.29 Industrial Studies

14	**1.29.1**	Describe the role of the Architect and their relationship with the client.
	1.29.2	Identify the duties and responsibilities of the Quantity Surveyor.
	1.29.3	Explain the duties of the Estimator.
	1.29.4	Describe the responsibilities of the Site Agent, General Foreperson/Supervisor.
	1.29.5	Explain the role of the Clerk of Works.

1.2 Craft related drawing

15	**1.2.10**	Identify types of construction drawings.
	1.2.11	Exercise in location, component & assembly drawings.

1.5 Safety

Week No

16	**1.5.1**	Understand the need for a safe working environment on site & in the workshop.
	1.5.2	Describe the purpose & use of R.I.D.D.O.R. 1996, Construction (Design & Management) Regs 1994, Management of Health & Safety at Work Regs 1992, Workplace (Health, Safety & Welfare) Regs 1992, Health & Safety (Display Screen Equipment) Regs 1992, Manual Handling Operations Regs 1992. PUWER
	1.5.3	Understand the duties of employer & employees with relation to the Health & Safety At Work Act.

1.9 Fixings

17	**1.9.1**	Describe & illustrate types of proprietary screws, bolts, plugs etc, used for fixing to wood, metal, plastics, manufactured sheet, brickwork, blockwork, concrete & stone.
	1.9.2	Explain factors effecting item choice.

18	**1.9.3**	Describe & illustrate types of proprietary nails used for fixing to the above situations.
	1.9.4	Explain factors effecting item choice.
	1.9.5	Describe other methods of fixing, i.e. chemical fixing etc.

1.2 Craft related drawing

Week No

19	**1.2.12**	Show examples of auxiliary projections.
	1.2.13	Exercise in auxiliary projection.

1.3 Timber related science

20	**1.3.19**	Describe common types of wood-boring insects found in this country.
	1.3.20	Describe the life cycle.
	1.3.21	Understand at which point in the cycle the most damage occurs.
	1.3.22	From examples identify the four main types.
	1.3.23	Describe the treatment & eradification of insect attack.

1.6 Protection, Storage & Safe Handling

21	**1.6.1**	State the need for safe storage of timber, sheet materials, hardware and ironmongery.
	1.6.2	Describe factors affecting the handling of components on-site and in the workshop.
	1.6.3	Understand the factors affecting the storage of components on-site and in the workshop.

1.2 Craft related drawing

Week No

22	**1.2.14**	Understand the purpose of setting-out rods.
	1.2.15	Show examples of setting-out rods.
	1.2.16	Describe how they are used for the marking out of components.
	1.2.17	Describe the use of broken-line rods.
	1.2.18	Briefly describe the use of cutting sheets.
	1.2.19	Set out a simple height and width rod for a door frame or window.

1.3 Timber related science

23	**1.3.24**	Describe the two ways in which sound travels.
	1.3.25	State the use of sheet, quilt and granular materials.
	1.3.26	Explain the use of secondary, double and triple glazing.
	1.3.27	Describe construction methods to increase sound insulation in new and existing situations.

1.6 Protection, Storage & Safe handling

24	**1.6.4**	Describe and illustrate safe methods of handling materials and components during manufacture and on completion on-site and in the workshop.
	1.6.5	During transport.

1.2 Craft related drawing

Week No

25	**1.2.20**	State the purpose of pictorial projection.
	1.2.21	Show examples of pictorial projections.
	1.2.22	Produce a drawing showing pictorial projections, i.e. mouldings, buildings etc.

1.3 Timber related science

26	**1.3.28**	Describe the three ways in which heat travels.
	1.3.29	State the need to prevent heat loss or gain.
	1.3.30	Describe the use of sheet, quilt and granular materials.
	1.3.31	Describe the construction methods to improve thermal insulation in new and existing buildings.

1.10 Hardware and ironmongery

27 - 28	**1.10.1**	Explain the factors affecting the choice of hardware and ironmongery.
	1.10.2	Describe types and fitting of ironmongery for use with doors and door frames for interior and exterior use.
	1.10.3	Describe types and fitting of ironmongery for use with casement windows.
	1.10.4	Explain the need for regular maintenance of ironmongery.

1.2 Craft related drawing

Week No

29	**1.2.23**	Understand the term surface development.
	1.2.24	State the need for surface developments.
	1.2.25	Produce a drawing showing surface developments of a cylinder, cone, pyramid and rectangular cylinder with the top cut at an angle.

1.3 Timber related science

30	**1.3.32**	Understand the term condensation.
	1.3.33	State the causes and effects of condensation.
	1.3.34	Describe methods to prevent condensation.

1.6 Protection, Storage & Safe handling

31	**1.6.6**	Describe and illustrate the safe method of providing care and safe storage of glass in the workshop and on site.
	1.6.7	Describe and illustrate the safe method of providing care and safe storage for inflammable liquids on-site and in the workshop.
	1.6.8	Explain the use of warning signs and information sheets etc.

1.2 Craft related drawing

Week No

32	**1.2.26**	Understand the terms quadrilaterals and triangles.
	1.2.27	Set out various examples of quadrilaterals and triangles to include square, rectangle, rhombus, trapezium, rhomboid, trapezoid, and with triangles construct equilateral, right angled, isosceles and scalene.

1.29 Industrial Studies

33	**1.29.6**	Describe the careers available in the wood based industries and the work undertaken by each.
	1.29.7	Describe the relationship with other trades in relation to house construction.
	1.29.8	Identify the main elements of a domestic dwelling and state the operational sequence.

1.1 Materials

34 - 35	**1.1.10**	Describe the composition and manufacture of Plywood, Chipboard, Blockboard, Hardboard and Waferboard.
	1.1.11	State situations where these boards would be used.
	1.1.12	Explain methods of fixing, safety precautions and methods of finishing.

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36 Foundation Examination

NOTES

2nd Year syllabus

In this final year it is very important that the students cover every topic included in the syllabus in preparation for their examination which will take place in early June.

The subject areas covered will be similar to that of the first year but of a higher level. In some cases it may be necessary to briefly go over the subject again to help the students remember what they have already covered.

The closing date for entries must be in by the beginning of the year once the entry forms have been handed out to the students.

It is possible and permitted for the students to see past papers which will indicate the standard required for a successful pass and membership of the Institute of Carpenters. These can be downloaded from the website www.iocexams.co.uk.

IOC 2 THEORY 1.5 HOURS

year & syllabus reference

The course content will cover:-

2.4 **Wood trade calculations.**

2.7 **Hand tools.**

2.8 **Methods of timber jointing.**

2.11 **Safe use of portable power tools.**

2.12 **Safe use of woodworking machinery.**

2.13 **Different types of door constructions.**

2.14 **Methods of constructions for door frames and linings.**

2.15 **The production of casement windows.**

2.16 **Methods of construction for fitments to include free-standing and shelving units.**

2.17 **Staircase construction for straight flight.**

2.18 **The construction of timber floors.**

2.19 **Wall panelling.**

2.20 **Finishings.**

2.21 **Partitioning.**

2.22 **Roof construction.**

2.23 **Formwork.**

2.24 **Scaffolding.**

2.25 **Shoring.**

2.26 **Arch centres.**

2.27 **Setting-out and levelling.**

2.28 **Repairs and maintenance**

2.7 Hand tools

Week No

1 **2.7.1** Introduction to the second year of the course. Examination forms and dates.

2.7.2 Recap on tools and maintenance.

2.7.3 Description and use of specialist tools, i.e. badger plane, moulding planes, side rebate planes, bullnose, compass planes etc.

2.4 Wood trade calculations

2 **2.4.1** Calculations involving number of joists and spacings for floors.

2.4.2 Calculations involving sheet coverings to roofs and dormer windows.

2.8 Timber jointing

3 **2.8.1** Proprietary timber jointing, use of corner fixing blocks etc.

2.8.2 Understand the use of counter cramps, traditional methods and proprietary.

2.8.3 Briefly describe woodworking machines used for specific jointing purposes.

2.11 Portable power tools

Week No

4 **2.11.1** Recap on safe use of power tools.

2.11.2 Describe the safe use of ballistic tools.

2.11.3 Understand the colour coding of cartridges.

2.11.4 Understand precautions to be observed when fixing to concrete, brickwork, blockwork, timber and metalwork.

2.11.5 Explain procedure to take when tool misfires etc.

2.11.6 Describe the safe use and operation of the Chop Saw.

2.12 Woodworking machinery

5 **2.12.1** Recap on purpose and requirements of the current woodworking regulations.

2.12.2 Describe the safe use of the surface planer.

2.12.3 Explain the positioning of guards.

2.12.4 Describe methods of adjustment to depth of cut.

2.12.5 State the use of push blocks.

2.12.6 Understand methods to obtain good surface finishes.

2.12.7 Describe methods used when planing bevelled work.

2.12.8 Explain work defects that could occur, i.e. back table out of alignment etc.

Week No		
6	**2.12.9**	Explain and describe the safe use of the thicknessing machine.
	2.12.10	State the purpose of different feed speeds.
	2.12.11	Describe the use of the friction rollers.
	2.12.12	Understand the safety precautions when using a machine with a solid feed roller.
	2.12.13	Describe jigs that are used with the machine.
	2.12.14	Understand why all machines need to be regularly maintained for continuous safe use.

2.4 Wood trade calculations

7	**2.4.3**	Calculations of roof members to include pythagoras's theorem.
	2.4.4	Explain the use of sines, cosines and tangents in roof and staircase work.

2.13 Doors

Week No

8	**2.13.1**	Describe and name the components of a panelled door to include muntins.
	2.13.2	Understand methods of construction.
	2.13.3	Describe machine and scribed jointing.
	2.13.4	Explain the purpose of a diminished stile.
	2.13.5	Understand the construction and fitting of the panels.
	2.13.6	Describe types and fixing of panel mouldings used including bolection mouldings.
	2.13.7	Explain methods of fitting, hanging and finishing.

9	**2.13.8**	Describe the use of domestic straight sliding doors.
	2.13.9	Understand the fitting of the track and floor guides.
	2.13.10	Describe methods of fitting the door and method of adjustment.
	2.13.11	Explain types of finish to the door including fitting of pelmet etc.

2.14 Door frames & Linings (internal & external)

Week No

10	**2.14.1**	Describe the construction and use of linings to include a transom with fanlight (borrowed light).
	2.14.2	Understand the construction of a lining with opening fanlight to include all ironmongery etc.
	2.14.3	Describe the construction of a door frame with transom to include fixed and opening fanlight.
	2.14.4	Explain the construction of a door frame for external use.
	2.14.5	Methods of weathering the door frame.
	2.14.6	Explain the different design factors for doors to open either in or out.

11	**2.14.7**	Describe the construction of a door frame for internal and external use to receive a pair of doors.
	2.14.8	Understand the term single and double action.
	2.14.9	State the use of intumescent strips.
	2.14.10	List and describe the ironmongery to be used.

2.15 Casement windows

Week No

12	**2.15.1**	Describe the construction of a casement window to include mullions.
	2.15.2	Describe the construction of a casement window to include transoms.
	2.15.3	Understand the use of opening and fixed fanlights.
	2.15.4	Describe methods of weathering.

13	**2.15.5**	Describe the construction and use of stormproof casement windows.
	2.15.6	Explain the use of opening and fixed fanlights.
	2.15.7	Describe the construction of stormproof windows to include mullions and transoms.
	2.15.8	State methods of weathering.
	2.15.9	List the types of ironmongery used.

2.20 Finishings

Week No

14	**2.20.1**	Understand the need to encase pipes and baths.
	2.20.2	Describe methods of encasing pipework.
	2.20.3	Explain methods of encasing baths.
	2.20.4	Explain the need for access provision.
	2.20.5	Describe methods of providing access panels for pipe casings and bath panels.

15	**2.20.6**	State the use of plinth blocks.
	2.20.7	Describe the use of linings for window openings.
	2.20.8	Methods of construction and fixing.
	2.20.9	State the use of window boards.
	2.20.10	Methods of construction and fixing.
	2.20.11	Describe the use of linings to window openings.
	2.20.12	State methods of construction and fixing.
	2.20.13	Describe the use of scotia moulds to window boards.

2.16 Fitments

Week No

16	**2.16.1**	Explanation and use of proprietary cupboard and shelf units, levelling, fitting etc.
	2.16.2	Understand methods of construction and installation.
	2.16.3	Methods of fitting work surface to include scribing to uneven wall.
	2.16.4	Explanation on fitting and jointing worktops end on and return.
	2.16.5	Explanation of fitting and adjusting proprietary cupboard doors to wall and base units.
	2.16.6	Explanation of fitting and fixing cover fillets for wall units etc.
	2.16.7	Understand provision for services etc.
	2.16.8	Describe methods of cutting and fitting for sink unit etc.

17	**2.16.9**	Description of proprietary shelving systems, i.e. "Spur shelving" “Tonk Strips” etc.
	2.16.10	Methods of fitting proprietary shelving system to provide shelving for libraries etc.
	2.16.11	Explanation of other types of shelving i.e. metal and timber brackets.
	2.16.12	Methods of levelling and fixing to solid and hollow walls.
	2.16.13	Description and construction of built in and corner shelf units of manufactured board and solid timber.
	2.16.14	Explanation of construction and fitting of timber slatted shelving including finishes.

2.4 Wood trades calculations

Week No

18	**2.4.5**	Estimating volume of concrete for foundations.
	2.4.6	Calculating excavation work.
	2.4.7	Calculation of concrete paths, stairs and walls etc.
	2.4.8	Calculating volume of concrete for columns, beams, floors etc.

2.18 Timber flooring (single upper floors only)

19	**2.18.1**	Explanation of construction for timber upper floor to include trimming for stairwell and hearth.
	2.18.2	State sizes of timbers used to conform to Building Regulations.
	2.18.3	Explanation on the methods used to support the floor joists, traditional and modern.
	2.18.4	Explanation on the spacing, levelling and fixing of the joists.
	2.18.5	Describe the fitting and fixing of strutting.

Week No

20	**2.18.6**	Describe methods of positioning notches and holes in the joists for services which comply with current regulations.
	2.18.7	Explain types and fixing of floor coverings.
	2.18.8	Describe methods of construction and securing access traps.
	2.18.9	State types and laying of floor coverings, i.e. cork tiles, carpet tiles etc.
	2.18.10	Describe the protection of the floor during construction.

2.17 Staircases (straight flight)

21	**2.17.1**	Revision on terms used.
	2.17.2	Current regulations on construction and guarding.
	2.17.3	Describe the construction of landings.
	2.17.4	Illustrate the finishings to well openings.
	2.17.5	Describe the methods of protection prior to leaving for site.
	2.17.6	Describe methods of fixing.
	2.17.7	Explain the fitting of undercarriage.
	2.17.8	Describe fitting of newel posts and handrails.
	2.17.9	Explain the fitting and spacing of balusters.
	2.17.10	Describe how the staircase is protected prior to use.

2.19 Wall panelling (dado height only)

Week No

22	**2.19.1**	Describe the use of proprietary wall panelling.
	2.19.2	Understand the levelling, fitting and purpose of loose and framed grounds.
	2.19.3	Describe the use of sheet materials.
	2.19.4	Describe methods of construction at internal and external corners.
	2.19.5	Show methods of fixing to include secret fixing.
	2.19.6	Describe the construction of panelling around recessed door and window openings.
	2.19.7	Understand types of finishes used.

2.21 Partitions

23	**2.21.1**	Describe the use of proprietary partitions.
	2.21.2	Understand the use of de-mountable partitions.
	2.21.3	Describe methods of forming openings etc.
	2.21.4	Describe types of finishes used and methods of fixing.
	2.21.5	Describe methods of improving sound insulation qualities.

2.4 Wood trades calculations

Week No

24	**2.4.9**	Calculations involving the circumference and area of an ellipse.
	2.4.10	Calculations involving the circumference and area of a segment.
	2.4.11	Use of formulae to find compass point to strike a segmental arch. A x B = C X D

2.22 Roofs (8m span double pitch to include hipped ends and over right angled plans).

25	**2.22.1**	Identify components of the roof, sizes etc
	2.22.2	Explain current building regulations.
	2.22.3	Describe the term double roof.
	2.22.4	Describe the construction of the hipped end.
	2.22.5	Explain the construction of a roof with a right angled return.
	2.22.6	Description of weathering to roof, ventilation etc.

Week No

26	**2.22.7**	Explanation and use of trussed rafters.
	2.22.8	Construction, storage and handling of trussed rafters.
	2.22.9	Erecting of trussed rafters.
	2.22.10	Construction to provide services etc.
	2.22.11	Finishes at verges, eaves and abutments.
	2.2.12	Construction of the hipped end.
	2.22.13	Description on forming access traps to loft spaces.

2.23 Formwork (timber only)

27	**2.23.1**	Describe the formwork required for strip and raft foundations.
	2.23.2	State the use of release agents.
	2.23.3	Describe the formwork required for forming steps (3 only) in-situ and pre-cast.
	2.23.4	State defects that could occur.
	2.23.5	Understand the need to design for maximum use.

2.4 Wood trades calculations

Week No

28	**2.4.12**	Calculations involving the volumes and surface area of solids.
	2.4.13	Calculate the volume of a rectangular and triangular prism.
	2.4.14	Calculate the volume of a circular, hexagonal and octagonal prism.
	2.4.15	Estimate volumes of solids from given examples.

2.24 Scaffolding (proprietary, free-standing access towers)

29	**2.24.1**	Describe the term independent scaffolding.
	2.24.2	Describe examples where this type of scaffolding would be used.
	2.24.3	Understand the need for safety and regular checks prior to use.
	2.24.4	Describe the need for adequate and safe storage.

2.25 Shoring (steel dead shoring to two storey only)

30	**2.25.1**	Describe the use of steel shoring.
	2.25.2	Explain situations where used.
	2.25.3	Describe the safe use and dismantling procedures.
	2.25.4	Understand the need for safe storage.
	2.25.5	Describe the protection of the public when in use.

2.26 Centering (timber, max 2m span with 300mm wall)

Week No

31	**2.26.1**	Describe the use of timber centering.
	2.26.2	Explain the construction for a semi-circular arch to include sheet materials.
	2.26.3	Describe methods of levelling and propping.
	2.26.4	Understand the reason for maximum use.
	2.26.5	Describe methods of easing.
	2.26.6	State safety precautions to be observed when in use.

2.27 Setting-out & levelling

32	**2.27.1**	Explain the use of a datum line
	2.27.2	Explain the methods of transferring levels.
	2.27.3	State the use of levelling pegs.
	2.27.4	Explain the methods of setting-out and checking right angles on site.
	2.27.5	Describe the taking and recording of measurements on site.

2.28 Repairs and maintenance

Week No

33	**2.28.1**	List situations where repairs may be necessary on internal and external doors.
	2.28.2	Describe maintenance and repairs for ironmongery.
	2.28.3	Understand repairs that may be necessary on joists and rafters.
	2.28.4	Show methods of recording sash windows.

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34 - 36	To cover any loose ends & revision for **Intermediate Examinations.**

IOC 2 ASSOCIATED SUBJECTS

year & syllabus reference

The course content will cover:-

2.1 Materials.

2.2 Craft related drawing.

2.3 Timber related science.

2.5 Safety.

2.9 Fixings.

2.10 Hardware & ironmongery.

2.1 Materials

Week No

1	**2.1.1**	Explain the term veneers.
	2.1.2	Describe the production of veneers.
	2.1.3	Appreciate the safe storage prior to use.
	2.1.4	Describe methods of cutting and laying veneers.
	2.1.5	Show examples of veneers and veneer work.
	2.1.6	Describe methods of sticking veneers.

2.2 Craft related drawing

2 - 3	**2.2.1**	Describe common mouldings used in construction work.
	2.2.2	Produce common mouldings indicating specific names.

2.3 Timber related science

4	**2.3.1**	Understand the term capillarity.
	2.3.2	Show experiments to prove capillarity.
	2.3.3	Describe situations where capillarity can occur and methods of prevention.
	2.3.4	Understand the term surface tension.
	2.3.5	Show experiments to prove surface tension.
	2.3.6	Describe situations where surface tension is used as an advantage, i.e. drips on cills.

2.1 Materials

Week No

5	**2.1.7**	Describe the manufacture of plasterboard.
	2.1.8	Explain fire resistant properties.
	2.1.9	Describe methods of cutting and fixing.
	2.1.10	State situations where used.
	2.1.11	Describe the manufacture of insulation board (tentest).
	2.1.12	Explain sound insulation properties.
	2.1.13	Describe methods of cutting and fixing.
	2.1.14	State situations where used.

2.2 Craft related drawing

6 - 7	**2.2.3**	Describe the use of broken line setting-out rods.
	2.2.4	Show examples of broken line rod drawings.
	2.2.5	Set out a broken line rod drawing of door frame and door to include transom.

2.3 Timber related science

8	**2.3.7**	Describe the use of flexible and non-flexible sealants.
	2.3.8	State situations where used.
	2.3.9	Describe methods of application.
	2.3.10	State safety precautions to be observed.

2.5 Safety

Week No

9	**2.5.1**	Understand the Personal Protection Equipment Regs 1992, Provision and Use of Work Equipment Regs 1992, Noise At Work Act Regs 1989, Factories Act 1961, Control Of Pollution Act 1971, Fire Precautions Act 1971, Shops Offices and Railway Premises Act 1963, Codes of Practice, C.O.S.H.H., PUWER

2.1 Materials

10	**2.1.15**	Describe the production of MDF board.
	2.1.16	Explain situations where used.
	2.1.17	Describe methods of cutting, moulding and fixing.
	2.1.18	Describe the application of veneers.
	2.1.19	State safety precautions to be observed.
	2.1.20	Describe types of finishes available.

2.2 Craft related drawing

11	**2.2.6**	Recap on the use of scale rules.
	2.2.7	Production of scale drawings to show front, end and plan elevations of panelled door.

2.3 Timber related science

Week No

12	**2.3.11**	Understand moisture movement in buildings.
	2.3.12	Understand design factors to allow for or minimise the effect of moisture movement.
	2.3.13	Demonstrate methods of recording moisture in materials (moisture meter) and in the air (wet and dry bulb hygrometer).

2.5 Safety

13	**2.5.2**	Describe fire and precaution procedures.
	2.5.3	List the categories of fires and the correct use of fire extinguishers. Types and uses. Colour code.

2.1 Materials

14	**2.1.21**	Describe the use and manufacture of laminated plastic.
	2.1.22	Show examples of laminated plastic.
	2.1.23	Describe methods of cutting and fixing.
	2.1.24	Explain methods of trimming.
	2.1.25	Describe safety precautions to be observed.

2.2 Craft related drawing

Week No

15 - 16	**2.2.8**	Show examples of different shaped arches.
	2.2.9	Produce drawings of semi-circular, segmented, elliptical, semi-elliptical, gothic, equilateral, lancet, tudor and ogee arches.
	2.2.10	State where these would be used.

2.3 Timber related science

17	**2.3.14**	Describe the three orders of levers.
	2.3.15	Determine various efforts, loadings and positions of fulcrum.

2.9 Fixings

18 - 19	**2.9.1**	Describe the use of self taping screws.
	2.9.2	Understand method of application.
	2.9.3	Describe other methods of fixing items to include proprietary adhesives.
	2.9.4	Describe the use of threaded studs and eyelet nails.
	2.9.5	Explain the use of screw cups and caps.
	2.9.6	Describe the use and fitting of handrail bolts.
	2.9.7	Describe the use of expansion plates, mirror plates, corner plates etc.

2.2 Craft related drawing

Week No

20 - 21	**2.2.11**	Explain the need to determine roof bevels.
	2.2.12	Determine roof bevel for equal pitched hipped roof to include plumb and seat cuts for common, hip, crown, and jack rafters.
	2.2.13	Determine roof bevels for equal pitched roof to include edge cuts for hip and jack rafters.
	2.2.14	Describe the purpose of the dihedral angle.
	2.2.15	Determine dihedral angle for hip rafter.
	2.2.16	Determine true lengths of common, crown, jack and hip rafters.

2.3 Timber related science

22	**2.3.16**	Recap on the problems of condensation.
	2.3.17	Describe the term interstitial condensation.
	2.3.18	State situations where this can occur.
	2.3.19	Describe problems that arise from interstitial condensation.
	2.3.20	Describe the use of vapour barriers.
	2.3.21	Describe the composition of vapour barriers.
	2.3.22	Explain the positioning of vapour barriers.

2.10 Hardware and ironmongery

Week No

23	**2.10.1**	Describe the use of floor springs.
	2.10.2	Explain single and double action floor springs.
	2.10.3	Describe various types available.
	2.10.4	Explain the fitting and adjustment of floor springs.
	2.10.5	Appreciate the importance of regular maintenance of floor springs.

2.2 Craft related drawing

24	**2.2.17**	Describe interpenetration of solids.
	2.2.18	Draw examples of interpenetration of round, square, hexagonal prism's.

2.3 Timber related science

25	**2.3.23**	Describe cavity wall insulation.
	2.3.24	Describe materials used.
	2.3.25	Explain cutting and fixing.
	2.3.26	Describe problems that can occur.

2.2 Craft related drawing

Week No

26	**2.2.19**	Produce simple full height and width rod of access trap to roof space.
	2.2.20	Suggest materials and sizes to be used.
	2.2.21	Produce cutting list from finished drawing.
	2.2.22	Calculate materials using given costings.

2.10 Hardware and ironmongery

27	**2.10.6**	Describe the use of security ironmongery.
	2.10.7	State types available for doors and windows.
	2.10.8	Describe methods of fixing.

2.3 Timber related science

28	**2.3.27**	Describe the composition of concrete.
	2.3.28	State various mixes for different situations.
	2.3.29	Describe the use of concrete vibrators for expelling air.
	2.3.30	Understand safety precautions when using concrete.
	2.3.31	State common defects that can occur.

2.2. Craft related drawing

Week No

29-31 **2.2.23** Development of roof surfaces of pitched and segmented dormer windows.

2.2.24 Set out front, side and plan of pitched and segmented dormer roofs inclined at 45^0.

2.2.25 Produce true shapes of opening in roof.

2.2.26 Develop surface of dormer roof covering.

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32 - 36 To cover any loose ends and revision for **Intermediate Examination.**

NOTES

Past papers and information on all the exams can be obtained by visiting the Institute of Carpenters examinations web page on www.iocexams.co.uk. Or alternatively contact :-

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