

NATIONAL VOCATIONAL TRAINING INSTITUTE

TESTING DIVISION

TRADE TESTING REGULATIONS AND SYLLABUS

TRADE: WOOD ENGINEERING CRAFT

LEVEL: CERTIFICATE ONE

CERTIFICATE ONE

A. INTRODUCTION

- i. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society.

It was also influenced by the TVET reforms under the directions of the new educational reforms with the view to opening up further education and training opportunities to TVET graduates. The certificate ONE syllabus is designed to respond to the following level descriptors:

QUALIFICATION	KNOWLEDGE LEVEL	SKILLS AND ATTITUDE:
Certificate 1	<ol style="list-style-type: none">1. To demonstrate a broad knowledge base incorporating some technical concepts.2. To demonstrate knowledge of the theoretical basis of practical skills.3. To demonstrate knowledge in numeracy, literacy, IT and Entrepreneurial skills	<ol style="list-style-type: none">1. Require a wide range of technical skills2. Are applied in a variety of familiar and complex contexts with minimum supervision.3. Require collaboration with others in a team

- ii. This syllabus is aimed at providing knowledge and also to train and impart required skills and knowledge to produce skillful craftsmen who will become self employed or work in the industry.

B. GENERAL OBJECTIVES

The Wood Engineering Craftsman (Carpenter and Joinery) performs the following activities:

- Prepares materials, and assemble them, erects and repairs structural and other woodwork at the workshop and in construction site using nails, screws, glue and other means.
- Works from plans, drawings, sketches and instructions
- Selects wood and other materials to be used for a particular job
- Mark out reference points according to pattern or plan to facilitate accurate cutting and shaping
- Cuts and shapes wood by hand or machine and performs such other operations as sawing, mortising, planing, sanding and finishing

C. THE COURSE COMPONENTS

Trade Theory

Science and Calculation

Trade Drawing

General Paper

Trade Practical

EXAMINATION: The candidates would be examined in the FIVE components listed in 'C' above.

Practical work must be carefully planned to illustrate application of the theory and to provide maximum opportunity for shop practice, laboratory work and demonstration.

D. KNOWLEDGE AND SKILLS REQUIREMENT

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments

E. ENTRY TO THE COURSE

Minimum education : Must have passed JHS or SHS examination. However, the selection of the students for the course is within the discretion of the head of the institution.

F. ELIGIBILITY FOR ENTRY TO EXAMINATION

Candidates may enter for examination only as internal candidate; that is those who at the time of entry to the examination are undertaking (or) have already completed the course at an approved establishment.

G. EXTERNAL EXAMINERS

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

H. EXAMINATION RESULTS AND CERTIFICATES

Each candidate will receive record of performance given the grade of performance for the components Taken. These are:

- i) Distinction
- ii) Credit
- iii) Pass
- iv) Referred/Fail

Certificates would be issued to candidates who pass in all the components.

NOTE:

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) IS compulsory.

I. APPROVAL OF COURSE

Institutions or other establishments intending to prepare trainees for the Examination must apply to:

THE COMMISSIONER
TESTING DIVISION
NVTI HEAD OFFICE
P. O. BOX MB 21, ACCRA

J. ACKNOWLEDGEMENT

NVTI wishes to acknowledge the preparatory material done by the team of Experts, which have been incorporated into this syllabus.

Mr. Mr. Sampson Botchoey

Mr. Joseph I.K. Korsah

Mr. Annang Baker in reviewing the whole materials and making necessary additions and recommendations is also appreciated.

Government's desire to improve the lot of Technical/Vocational Education and Training which led to the preparation of this syllabus, is hereby acknowledged.

RECOMMENDED TEXT BOOKS

NO	TITLE OF BOOK	AUTHOR	YEAR OF PUBLICATION	PUBLISHERS
1.	Carpentry & Joinery for Building Craft Students. Book 1 & 2	Peter Bret	1982	Hutchison Group (SA) (Pty) Led Bergulei 2012, South Africa
2.	Carpentry and Joinery 2 nd Edition	George Mitchell	1997	Wellington House, 125 Strand, London WC 2R OBB, England
3.	Woodwork for Senior Secondary Schools	J.K.N Sackey E.A. Manu R.Y Baafi	1994	Published in association with the Ministry of Education, Accra, Ghana Printed by Buck Press Ltd. Accra Ghana
4.	Woodwork in Theory and Practice	John Walton	1947	The Australasian Publishing Company
5.	Carpentry and Joinery Book 1& 2	David R. Bates	1984	Macdonald & Evans E.d Longman Scientific & Technical
6.	Carpentry & Joinery	W.B. Mckay		
7.	Carpentry and Joinery	Brian Porter		
8.	Carpentry and Joinery	By George Love		
9.	Craft Technology for Carpenters & Joiners	By Frank Hilton		
10.	Wood Technology	MB Shrivastava	1997	Vikas Publishing House PVT Ltd., New Delhi
11.	Furniture Facts	Furniture Facts Publications	1977	Furniture Facts Publications U.S.A.

TOOLS AND EQUIPMENT

NO	PORTABLE POWER TOOLS	BASIC HAND TOOLS
1.	Hammer drill	Tape measure
2.	Drill stand	Crosscut saw
3.	Orbital sander	Tenon saw
4.	Belt sander	Smoothing plane
5.	Disc sander	Try square
6.	Circular saw	Chisel set of 9 4pesmin
7.	General purpose saw	Marking gauge
8.	Jig saw	Pincers
9.	Electric plane	Screw driver
10.	Powered screwdrin	Jack plane
11.	Laminate trimmer	
12.	Portable electric router	
	MACHINES	
	Cross cut saw	
	Single end tenon	
	Belt sander (Disc)	
	Narrow band saw	
	Vertical spindle moulder	
	The working lather	
	The jig saw	
	Mitting table circular	
	Thicknesser/planner	
	Mortiser (chain slot & anger)	
	Surface/jointer	

NOTES: *The basic tools listed are only required as trainees tool kit.
There are many others which are not covered here.*

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
1.0	SAFETY	1.1 Personal Safety	1.1.1 Observe personal safety 1.1.2 Know the names and the uses of personal protective equipment 1.1.3 Maintain personal safety equipment 1.1.4 Use safety equipment such as fire extinguishers, guards, goggles etc.
		1.2 Workshop Safety	1.2.1 Observe workshop safety 1.2.2 Keep the workshop tidy before and after working 1.2.3 Ensure that there is enough ventilation, daylight etc. 1.2.4 Avoid running in the workshop 1.2.5 Know position of electrical cut outs. 1.2.6 Avoid interfering with other people's work
		1.1 Material Safety	1.3.2 Identify hazards components in the workshop 1.3.3 Know the safe uses of hazardous materials such as lacquer, thinner, vanish etc. 1.3.4 know the position of first aid box
		1.1 Tools and machine safety	1.4.1 follow the instructions for the use of a particular tool and machine 1.4.2 Check electrical connections and wiring on machines regularly 1.4.3 Ensure that you are trained in a particular machine or tools before using it e.g. uses of safety equipment and gadgets 1.4.4. Remove plugs from sockets before making any adjustment of a machine 1.4.5 demonstrate the safe handling of tools
2.0	CLASSIFICATION OF HAND TOOLS	2.1 Geometrical or marking out tools	2.1.1 identify geometrical or marking out tools 2.1.2 know the uses of geometrical tools 2.1.3 sketch and label parts of marking out tools such as marking gauge, compasses, dividers etc.
		2.1 Cutting tools	2.2.1 Name, identify cutting tools 2.2.2 Know the uses of cutting tools 2.2.3 Sketch and label parts of cutting tools such as planes, saws, chisels, boring tools etc.

		2.3 Holding and supporting tools	2.3.1 Name, identify holding and supporting tools 2.3.2 know the uses of holding and supporting tools 2.3.3 Sketch and label parts of holding and supporting tools such as the workbench, bench vice, sash cramp, Gee cramp, holdfast, bench hook, bench stop etc.
		2.4 Percussion and impelling tools	2.4.1 Name and identify percussion and impelling tools 2.4.2 know the uses of percussion and impelling tools 2.4.3 Sketch and label parts of percussion and impelling tools such as crowbar, claw hammer, Warrington hammer, screw drivers, pincers, nails pullers, mallet etc.
		2.5 Miscellaneous tools	2.5.1 Name and identify miscellaneous tools 2.5.2. Know miscellaneous tools 2.5.3 Sketch and label miscellaneous tools such as scraper, oil can, spanner, plier etc.
3.0	PORTABLE POWER TOOLS	3.1. Portable powered planer 3.2 portable powered jointer 3.3. portable powered circular saw 3.4 portable powered drill 3.5 portable powered jig saw 3.6 portable orbital sander 3.7 portable powered belt sander 3.8 portable powered disc sander 3.9 portable powered router 3.10 portable power screw driver	3.1.1. Name and identify portable power tools 3.1.2 Know the uses of portable power tools
4.0	WOODWORKING MACHINES	4.1 Thicknesser/Planner 4.2 Jointer/surface machine 4.3 Circular saw machine 4.4 Band saw machine 4.5 Mortiser (chain slot, auger) 4.6 Sander (belt, disc) 4.7 Wood lathe 4.8 Spindle moulder 4.9 Radial arm saw 4.10 Pillar drill	4.1.1 Name and identify woodworking machines 4.1.2 Know the uses of woodworking machines 4.1.3 State the functions of guards, cutters, fence, etc on a machine.

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
5.0	CLASSIFICATION OF WOOD WORKING JOINTS	5.1 Lengthening joints	5.1.1 Name and identify lengthening joints 5.1.2 Know the uses of lengthening joints 5.1.3 Sketch all the lengthening joints such as scarf joint, fish platted joint, beam laminated joint, splayed joint etc.
		5.2 Widening joints	5.2.1 Name and identify widening joints 5.2.2 Know the uses of widening joints 5.2.3 Sketch all the widening joints, eg. simple-butt joint, tongue and groove joint, rebated joint, dowel joint etc.
		5.3 Angle/Framing joints	5.3.1 Name and identify angled joints 5.3.2 Know the uses of angled or framing joints 5.3.3 Sketch the angled joints, e.g. mortise joints, Halving joints, dovetail joints, housing joints, mitre joints, bridle joints etc. and state where they are used.
6.0	TIMBER	6.1 Growth and structure of timber	6.1.1 Describe the major parts of a tree
		6.2 Cross-section of a tree	6.2.1 Name and identify parts of a cross-section of a tree 6.2.2 Know the functions of the various parts of a cross-section of a tree
		6.3 Sources of softwood and hardwood	6.3.1 Explain the growth characteristics of softwood and hardwood
		6.4 Commonly used timbers	6.4.1 Identify commonly used timber 6.4.2 Know local Ghanaian timbers and their uses

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
7.0.	CONVERSION OF TIMBER	7.1 Methods	7.1.1 Know various methods of conversion of timber E.g. <ul style="list-style-type: none"> • Through and through sawing • Quarter sawing • Tangential sawing • Boxed-heart sawing 7.1.2 Know the advantages and disadvantages of various methods of conversion of timber 7.1.3 Produce sketches of various methods of conversion of timbers
		7.2 Marketable sizes of timber	7.2.1 Identify the following marketable sizes of timber <ul style="list-style-type: none"> • Boards • Beams • Scantlings • Baulk etc. and state their sizes
8.0	SEASONING OF TIMBER	8.1 Definition of seasoning 8.2 Methods of seasoning timber	8.1.1 Defining seasoning of timber 8.1.2 Name and explain two methods of seasoning timber (natural and artificial) 8.1.3 Sketch natural and artificial methods of seasoning timber and label all the parts 8.1.4 State the advantages and disadvantages of each method
9.0	DEFECTS IN TIMBER	9.1 Explanation of defects in timber	9.2.1 Explain defects in timber 9.2.2 Differentiate natural defects from artificial defects 9.2.3 Identify various types of defects and their causes 9.2.4 Sketch types of defects e.g. star shake, cup shake, upset, knots, twisted grain, checks twisting, bowing, cupping collapse, case hardening

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
10.0	TIMBER PRESERVATION	10.1 Explanation of timber preservations	10.1. Explain timber preservation
		10.2 Types of timber preservatives	10.2.1 Know types of timber preservatives e.g. tar oil, water soluble, organic solvent, etc.
		10.3 Methods of application	10.3.1 List and explain methods of application e.g. non-pressure treatment – brushing, spraying, dipping, stippling and charring pressure treatment – empty cell process and full cell process etc.
11.0	MANUFACTURED BOARDS	11.1 Explanation of manufactured boards	11.1.1 Explain manufactured boards 11.1.2 State types of manufactured boards e.g. plywood, block boards, lamin board, batten board, chip board (particle board) composite board 11.1.3 Sketch the various types of manufactured boards and state their specific uses 11.1.4 State advantages and disadvantages of manufactured boards
12.0	ADHESIVES	12.1 Explanation of adhesives	12.1.1 Explain adhesives used in the wood industry 12.1.2 List and explain types of wood adhesives e.g. PVA, animal glue, contact glue, casein glue, synthetic resin etc. 12.1.3 State uses of the various types of wood adhesives 12.1.4 List and explain terms used in adhesives. e.g. shelf life, pot life, storage life, gap filling 1NT, WBP, MR, BR.

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS		SUB-POINTS	
13.0	DOOR/WINDOW FRAME	13.1	Description of wooden door and window frames, sketch and labeling of parts, purposes of functions, constructional procedures and method of fixing	13.2.1	Describe door and window frames made of wood
				13.2.2	Sketch and label wooden door/window frames showing all the parts including transom
				13.2.3	State purpose or functions of door and window frames
				13.2.4	State constructional procedures and methods of fixing frames
				13.2.5	State the necessary treatment given to frames before fixing e.g. priming, bevels, throating
14.0	ALUMINIUM DOOR/WINDOW FRAMES	14.1	Description of aluminium door/window frames	14.2.1	Describe aluminium door/window frames
		14.1	Purpose and functions of aluminium door/window frames	14.2.2	State purpose/functions of aluminium doors/window frames
		14.1	Constructional procedures and methods of fixing	14.2.3	Describe constructional procedures and methods of fixing aluminium frames
		14.1	Tools and equipment for construction and fixing	14.2.4	List and explain tools/equipment used in construction and fixing of aluminium frames to building
		14.1	Fittings for fixing frames	14.2.5	List and state the uses of fittings for fixing aluminium frames e.g. screws, plugs etc
		14.1	Precautions for handling frames	14.2.6	State the necessary precautions needed to handle aluminium frames before and during fixing
15.0	ALUMINIUM DOORS AND WINDOWS	15.1	Description of aluminium windows	15.2.1	Describe aluminium doors and windows
		15.1	purpose and functions of aluminium doors and frames	15.2.2	State the functions of aluminium doors and windows
				15.2.3	Sketch and label parts of aluminium doors and windows
				15.2.4	Describe methods and procedures for manufacturing aluminium doors and windows

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
		15.1.3 Parts of aluminium doors and frames with sketches	15.2.5 State and describe the uses of fittings/iron mongery on aluminium doors and frames 15.2.6 State the necessary precautions to be taken during handling and fixing 15.2.7 State advantages and disadvantages of aluminium doors and windows.
16.0	WOODEN DOORS	16.1.1 Description of wooden doors and windows, types of doors, methods of construction and fixing, iron mongery/fittings	16.1.2 Describe various types of wooden doors and windows e.g flush, doors, panel doors, panel windows, battened doors, battened windows, etc. 16.2.2 State the process of constructing the various types of doors 16.2.3 List and sketch suitable joints for the various types of doors e.g hunched mortise and tenon joint, rebated joint, dowel joint etc. 16.2.4 Describe the procedure for fixing a door 16.2.5 State procedure for fixing locks on doors
17.0	IRON MONGERY/ FITTINGS	17.1 Description of iron mongery, classification, types, functions and fixing	17.2.1 Describe types of iron mongery e.g. nails, screws, bolts, locks, hinges, barrel bolt etc. 17.2.2 Classify iron mongery under:- i) fixing devices ii) fittings which allow movement iii) fittings which provide security 17.2.3 Sketch and describe the uses of various types of ironmongery
18.0	FORMWORK	18.1 Identification of various types of formwork	18.2.1 Identify various types of formwork 18.2.2 Describe and sketch types of formwork e.g. square columns, beams, floors, window cill 18.2.3 Differentiate between pre-cast and cast-in-situ formwork

CERTIFICATE ONE – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
19.0	FINISHING AND FINISHES	19.1 Definition of finishing 19.2 Procedure for finishing 19.3 Explanation of finishes 19.4 uses of finishes 19.5 Methods of application and finishes	19.2.1 Define the term finishing 19.2.2 State the process of finishing a piece of wooden item 19.2.3 List and describe the materials used during finishing 19.2.4 State purpose of finishing 19.2.5 Explain finishes in relation to woodwork 19.1.6 List types of finishes and state their uses 19.1.7 State methods used for the application of finishes 19.1.8 State advantages and disadvantages of using various types of finishes

CERTIFICATE ONE - TRADE DRAWING

TASK		CRITICAL POINTS	SUB-POINTS
20.1	DRAWING AND DRAWING EQUIPMENT	20.1 Explanation of the meaning of drawing 20.2 Selection, uses and maintenance of drawing equipment	20.2.1 Explain the meaning of drawing 20.2.3 Identify and select drawing equipment appropriately 20.2.3 Manipulate drawing equipment effectively 20.2.4 State the reasons to maintain drawing equipment in good condition
21.0	LETTERING	21.1 Identification of types of lettering	21.2.1 Identify various types of lettering used on drawings e.g. upper case and lower case 21.2.2 Do classwork/assignment on lettering involving the use of upper case and lower case
22.0	TYPES OF LINES USED IN DRAWING	22.1 Listing, explanation and construction of lines	22.2.1 Produce types of line and indicate their uses. e.g. construction lines. Sectional lines, dimension lines, broken lines, continuous lines, finishing lines and centre lines
23.0	BISECTION AND DIVISION OF LINES	23.1 Bisection of lines and division of lines	23.2.1 Bisect a given line 23.2.2 Divide a given line into a number of equal part 23.2.3 Divide a line to a given ratio e.g. 3:5:7
24.0	ANGLES	24.1 Construction of angles	24.2.1 Construct various angles e.g. 90°, 45° 60°, 30° etc. Complementary, supplementary reflex, acute angles etc.
25.0	PLANE FIGURES	25.1 Construction of plane figures 25.2 Construction of triangles 25.3 Construction of polygons 25.4 Construction of quadrilaterals	25.2.1 Construct plane figures with given dimensions e.g. Triangles, polygons, quadrilaterals, circles etc. 25.2.2 Construct types of triangles e.g. right angled, triangle, isosceles triangle, scalene triangle, equilateral triangle, etc. 25.2.3 Construct types of polygons e.g. pentagon, hexagon, heptagon, octagon etc. 25.1.4 Construct types of quadrilaterals e.g. square, rhombus, parallelogram, trapezium, trapezoid, etc.

CERTIFICATE ONE - TRADE DRAWING

TASK		CRITICAL POINTS	SUB-POINTS
26.0	CIRCLES	26.1 Definition and construction of circles	26.2.1 Define circle 26.2.2 Construct a circle and show its elements e.g. circumference chord, diameter, normal, tangent, segment, sector, radius, arc etc. 26.2.3 Define and construct concentric and eccentric circles 26.2.4 Draw circles in isometric projection
27.0	ELLIPSE	27.1 Definition and construction of Ellipse	27.2.1 Define ellipse 27.2.2 Know major and minor axis 27.2.3 Construct ellipse by using different methods such a foci pins and string, intersecting lines, concentric circles, alternative intersecting lines and trammel method
28.0	ISOMETRIC AND OBLIQUE PROJECTIONS	28.1 Explanation of isometric and oblique projection with illustration	28.2.1 Explain the difference between isometric and oblique projection 28.2.2 Illustrate with drawing and indicate the angles
29.0	ORTHOGRAPHIC PROJECTION	29.1. Explanation of orthographic projection 29.2 Drawing of simple objects in 1 st and 3 rd angle projection	29.2.1 Explain the difference between first angle and third angle projections. 29.2.2 Draw a simple object in 1 st and 3 rd angle projection showing all elevations. E.g. Kitchen stool ordinary writing table, bedside cabinet etc.

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS
30.0	MEASURATION	30.1 Area of square/ rectangle 30.2 Perimeter of figures 30.3 Area of a circle 30.4 Perimeter of a circle 30.5 Area of triangles 30.6 Calculate the perimeter of a triangle	30.2.1 State the formula for calculating the area of square and rectangle e.g. Square = L^2 , Rectangle – Length x breadth (L x B) 30.2.2 Calculate the perimeter of a given figure E.g. Square = 4a where ‘a’ is the distance of one side 30.2.3 Calculate the perimeter of a given figure using the formula $2(L+B)$ 30.2.4 Calculate the area of a given circle using the formula $2\pi r$ 30.2.5 Calculate the area of a triangle using the formula $\frac{1}{2} b \times h$
			30.2.6 Calculate the perimeter of a triangle using the formula $a+b+c$ where abc represents the lengths of the three sides
31.1	VOLUMES	31.1 Volumes of figures	31.2.1 Calculate the volumes of given figures, e.g. Cone = $\frac{\text{Area of } \pi r^2 h}{3}$ 31.2.2 Calculate the volume of a cylinder $\pi r^2 h$ 31.2.3 Calculate the volume of a rectangular pyramid $\frac{LBH}{3}$
32.0	ESTIMATION AND COSTING	32.1 Preparation and estimated cost of a given project work	32.2 Prepare an estimated cost of given project e.g. Kitchen stool, writing table, writing chair, panel doors, bedside cabinet, bestead etc.
33.0	PERCENTAGES	33.1 Calculation of Percentages	33.2 Calculate between 5% to 20% to cover overheads, labour, transport, profit etc. of an estimated project as stated in item 32.1.1.
34.0	MOISTURE CONTENT	34.1 Factors affecting the evaporation of moisture in timber 34.2 Methods of determining moisture content in timber	34.1.1 State and explain factors that affects the evaporation of moisture in timber. 34.2.2 State and explain methods of determining moisture content in timber. E.g. moisture meter. Oven dry method

TASK		CRITICAL POINTS	SUB-POINTS
		34.3	34.2.1 Calculate moisture content of a piece of timber by using the formular $\frac{\text{Wet weight} - \text{Dry weight}}{\text{Dry weight}} \times 100$

CERTIFICATE ONE - PRACTICAL

TASK		CRITICAL SKILLS	SUB-SKILLS
1.0	RIPPING, CROSS-CUTTING, PLANNING AND CHISELLING	1.1.1 Ripping of timber 1.1.2 Cross cutting of timber 1.1.3 Planing of timber 1.1.4 Chiselling of timber	1.2.1 Mark out a piece of timber along the grain and saw by using rip saw 1.2.2 Mark out a piece of timber across the grain and cut by using cross cut saw 1.2.3 Plane a piece of timber flat and square and put edge and face marks 1.2.4 Chisel a piece of marked timber to the required dimension e.g. length, width and depth.
2.0	SHARPENING OF TOOLS	2.1.1 Sharpening and setting of plane cutters	2.2.1 Sharpen plane cutter and check for the squareness. Ensure that the sharpening angle between 25° - 30° is maintained. 2.2.2 Sharpen chisel and check for squareness and maintain the sharpening angle between 25° - 30°
3.0	PREPARATION OF TIMBER	3.1.1 Preparation of Timber by using hand tools 3.1.2 Preparation of timber by using machines	3.2.1 Prepare pieces of timber by using hand tools, observe all the skills involved at every stage 3.2.2 Prepare pieces of timber by using machines. Observe all the procedures and safety regulations regarding to the use of each machines
4.0	BASIC WOODWORKING JOINTS	4.1.1 Construction of angle joint/framing joint,	4.2.1 Construct angle joints/framing joints E.g. Mortise and tenon joint, cross halving joint, Tee halving joint, mitre joint, through or common dovetail joint, lap dovetail joint, through housing joint, stopped housing joint, corner housing joint, shoulder housing joint, dowel joint, haunched mortise and tenon, long and short shouldered mortice and tenon joint 4.2.2 Practice draw-pinning using through mortise and tenon joint,
	√	4.1.2 Construction of widening joints	4.2.3 Construct widening joints. Simple butt, rebated joint, tongue and grooved joint, dowelled joint, shiplap boarding, TGV jointed etc.
	√	4.1.3 Construction of lengthening joint	4.3.1 Construct lengthening joints e.g. scarf joint, splayed joint, fish plated, beam laminated scarf joint Bolted and plated, etc.

CERTIFICATE ONE - PRACTICAL

TASK		CRITICAL SKILLS	SUB-SKILLS
5.0	DOOR/WINDOW FRAMES	5.1.1 Construction of door/window frames	5.2.1 Construct door/window frames by using hand tools and machines. Make provision for transom, weathering and throating.
6.0	DOORS	6.1.1 Construction of doors	6.2.1 Construct panel door e.g. A door with 5 panels, 6 panels, 7 panels and 8 panels.
7.0		7.1.1 Construction of battened doors	7.2.1 Construct all kinds of battened doors e.g. <ul style="list-style-type: none"> • Ledged and battened door • Ledged, braced and battened door • Framed, ledged braced and battened door 7.2.2 Construct battened window
8.0		8.1.1 Construction of flush doors	8.2.1 Construct solid and skeleton core flush doors
9.0		9.1.1 Construction of glazed door (wooden frame)	9.2.1 Construct half glazed and full glazed doors in wooden frame
10.0		10.1.1 Construction of window	10.2.1 Construction louvered window (Joulosie window)

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE THEORY**

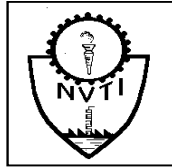
NO	TOPIC	COGNITIVE KNOWLEDGE		AFFECTIVE UNDERSTANDING		PSYCHOMOTOR APPLICATION		TOTAL
		OBJ	SUB	OBJ	SUB	OBJ	SUB	
1.	Safety	2	2	2	2	1	1	10
2.	Classification of tools	3	2	1	1	-	-	7
3.	Portable power tools	2	2	2	2	1	-	9
4.	Wood working machines	2	1	1	1	1	-	6
5.	Classification of tools	3	2	1	1	1	-	8
6.	Timber	2	2	1	1	-	-	6
7.	Conversion of timber	2	2	1	1	-	-	6
8.	Seasoning of timber	2	1	1	1	-	-	5
9.	Defects in timber	3	2	1	2	-	-	8
10.	Timber preservation	2	2	1	1	-	-	6
11.	Manufactured boards	2	2	1	1	-	-	6
12.	Adhesives	2	1	1	1	-	-	5
13.	Door and window frame	2	2	2	2	-	1	9
14.	Aluminium door and window	2	1	1	1	-	-	5
15.	Wooden doors	2	2	1	1	-	-	6
16.	ironmongery	2	2	2	2	-	-	8

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE DRAWING**

NO	TOPIC	COGNITIVE KNOWLEDGE		AFFECTIVE UNDERSTANDING		PSYCHOMOTOR APPLICATION		TOTAL
		OBJ	SUB	OBJ	SUB	OBJ	SUB	
1.	Formwork	2	1	2	1	1	-	
2.	Finishing & finishes	2	2	1	1	-	-	
3.	Drawing and drawing equipment	2	1	2	1	-	-	
4.	Types of lines	2	2	2	1	-	-	
5.	Bisecting and division of lines	2	1	1	1	-	-	
6.	Angles	3	2	1	1	-	1	
7.	Plane figures	3	2	2	1	-	1	
8.	Ellipse	2	1	1	1	-	1	
9.	Isometric & oblique projections	3	1	2	1	-	-	
10.	Orthographic projection	2	1	1	-	-	-	

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE SCIENCE AND CALCULATION**

NO	TOPIC	COGNITIVE KNOWLEDGE		AFFECTIVE UNDERSTANDING		PSYCHOMOTOR APPLICATION		TOTAL
		OBJ	SUB	OBJ	SUB	OBJ	SUB	
1.	Mensuration	3	2	2	2	-	-	9
2.	Volumes	2	1	2	2	-	-	7
3.	Estimation and costing	3	2	2	2	-	1	10
4.	Percentages	2	1	2	2	1	-	8
5.	Moisture content	2	1	1	1	-	1	6



NATIONAL VOCATIONAL TRAINING INSTITUTE

TESTING DIVISION

TRADE TESTING REGULATIONS AND SYLLABUS

TRADE: WOOD ENGINEERING CRAFT

LEVEL: CERTIFICATE TWO

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CARPENTRY AND JOINERY

CERTIFICATE TWO

A. INTRODUCTION

- iii. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society.

It was also influenced by the TVET reforms under the directions of the new educational reforms with the view to opening up further education and training opportunities to TVET graduates. The certificate TWO syllabus is designed to respond to the following level descriptors:

QUALIFICATION	KNOWLEDGE LEVEL	SKILLS AND ATTITUDE:
Certificate II	<ol style="list-style-type: none">1. To demonstrate broad knowledge base with substantial depth in area(s) of study.2. To demonstrate a command of analytical interpretation of range of data.3. To present results of study accurately and reliably.	<ol style="list-style-type: none">1. Needs varied skills and competencies in different tasks under various contexts.2. Require a wide range of technical and supervisory skills.3. Would be employed in different contexts.

- ii. This syllabus is aimed at providing knowledge and also to train and impart required skills and knowledge to produce skillful craftsmen who will become self employed or work in the industry.

B. GENERAL OBJECTIVES

The Wood Engineering Craftsman (Carpenter and Joinery) performs the following activities:

- Prepares materials, and assemble them, erects and repairs structural and other woodwork at the workshop and in construction site using nails, screws, glue and other means.
- Works from plans, drawings, sketches and instructions
- Selects wood and other materials to be used for a particular job
- Mark out reference points according to pattern or plan to facilitate accurate cutting and shaping
- Cuts and shapes wood by hand or machine and performs such other operations as sawing, mortising, planing, sanding and finishing

C. THE COURSE COMPONENTS

Trade Theory
Science and Calculation
Trade Drawing
General Paper
Trade Practical

EXAMINATION: The candidates would be examined in the FIVE components listed in 'C' above.

Practical work must be carefully planned to illustrate application of the theory and to provide maximum opportunity for shop practice, laboratory work and demonstration.

D. KNOWLEDGE AND SKILLS REQUIREMENT

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments

E. ENTRY TO THE COURSE

Minimum education: Must have passed the Certificate One (I) examination.

F. ELIGIBILITY FOR ENTRY TO EXAMINATION

Candidates may enter for examination only as internal candidate; that is those who at the time of entry to the examination are undertaking (or) have already completed the course at an approved establishment.

G. EXTERNAL EXAMINERS

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

H. EXAMINATION RESULTS AND CERTIFICATES

Each candidate will receive record of performance given the grade of performance for the components Taken. These are:

- v) Distinction
- vi) Credit
- vii) Pass
- viii) Referred/Fail

Certificates would be issued to candidates who pass in all the components.

NOTE:

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) compulsory.

I. APPROVAL OF COURSE

Institutions or other establishments intending to prepare trainees for the Examination must apply to:

THE COMMISSIONER
TESTING DIVISION
NVTI HEAD OFFICE
P. O. BOX MB 21, ACCRA

J. ACKNOWLEDGEMENT

NVTI wishes to acknowledge the preparatory material done by the team of Experts, which have been incorporated into this syllabus.

Mr. Mr. Sampson Botchoey

Mr. Joseph I.K. Korsah

Mr. Annang Baker in reviewing the whole materials and making necessary additions and recommendations is also appreciated.

Government's desire to improve the lot of Technical/Vocational Training, which led to the preparation of this syllabus, is hereby acknowledged.

RECOMMENDED TEXT BOOKS

NO	TITLE OF BOOK	AUTHOR	YEAR OF PUBLICATION	PUBLISHERS
1.	Carpentry & Joinery for Building Craft Students. Book 1 & 2	Peter Bret	1982	Hutchison Group (SA) (Pty) Led Bergulei 2012, South Africa
2.	Carpentry and Joinery 2 nd Edition	George Mitchell	1997	Wellington House, 125 Strand, London WC 2R OBB, England
3.	Woodwork for Senior Secondary Schools	J.K.N Sackey E.A. Manu R.Y Baafi	1994	Published in association with the Ministry of Education, Accra, Ghana Printed by Buck Press Ltd. Accra Ghana
4.	Woodwork in Theory and Practice	John Walton	1947	The Australasian Publishing Company
5.	Carpentry and Joinery Book 1& 2	David R. Bates	1984	Macdonald & Evans E.d Longman Scientific & Technical
6.	Carpentry & Joinery	W.B. Mckay		
7.	Carpentry and Joinery	Brian Porter		
8.	Carpentry and Joinery	By George Love		
9.	Craft Technology for Carpenters & Joiners	By Frank Hilton		
10.	Wood Technology	MB Shrivastava	1997	Vikas Publishing House PVT Ltd., New Delhi
11.	Furniture Facts	Furniture Facts Publications	1977	Furniture Facts Publications U.S.A.

TOOLS AND EQUIPMENT

NO	PORTABLE POWER TOOLS	BASIC HAND TOOLS
1.	Hammer drill	Tape measure
2.	Drill stand	Crosscut saw
3.	Orbital sander	Tenon saw
4.	Belt sander	Smoothing plane
5.	Disc sander	Try square
6.	Circular saw	Chisel set of 9 4pesmin
7.	General purpose saw	Marking gauge
8.	Jig saw	Pincers
9.	Electric plane	Screw driver
10.	Powered screwdrin	Jack plane
11.	Laminate trimmer	
12.	Portable electric router	
	MACHINES	
	Cross cut saw	
	Single end tenon	
	Belt sander (Disc)	
	Narrow band saw	
	Vertical spindle moulder	
	The working lather	
	The jig saw	
	Mitting table circular	
	Thicknesser/planner	
	Mortiser (chain slot & anger)	
	Surface/jointer	

NOTES: *The basic tools listed up are only required for trainees tool kit.*

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There are many others which are not covered here.

CERTIFICATE TWO – TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS
1.0	SETTING OUT AND LEVELLING	1.1 Know setting out and levelling principles and use of levels	1.2.1 Understand the basic setting out principles 1.2.2 Establish the position of the building and set out profile boards 1.2.3 Establish a datum peg and transfer require levels to various positions 1.2.4 List the sequence of operations used to setout a simple building 1.2.5 Describe the use of boning rod 1.2.6 Describe three methods which can be used to set out right angles
2.0	STAIRS	2.1 Construction of stairs	2.2.1 Describe stairs and its functions 2.2.2 State and describe types of stairs and their categories 2.2.3 Explain terms and parts of stairs 2.2.4 State regulations governing private and public stairs 2.2.5 Sketch straight flight and label all parts 2.2.6 Sketch the joint between newel post and stringer, tread and riser, handrail and newel post 2.2.7 Sketch the pitch board and indicate rise, going, and margin 2.2.8 Determine the number of risers and going in a straight flight
3.0	FLOORS	Description of floors	3.2.1 Describe type of floors (both ground and upper floors) 3.2.2 State functions of floors 3.2.3 Know the terminologies used to describe floor members 3.2.4 State building regulations governing construction of floors

CERTIFICATE TWO – TRADE THEORY

TASK		CRITICAL SKILLS	SUB-SKILLS
			3.2.5 Understand the layout and levelling of floor joist. 3.2.6 Understand the treatment around the opening of the stair well 3.2.7 Sketch types of connectors used to connect floor joint to the wall 3.2.8 Understand sound insulations in floors 3.2.9 Sketch floors and indicate the various joints and their arrangements, including herring solid structing
4.0	ROOFS	4.1 Construction of roofs	4.2.1 Describe roofs in general 4.2.2 State and describe types of roof e.g flat roof, lean-to-roof, hipped end roof truss roof 4.2.3 Understand the terminologies and principles in roof work. 4.2.4 Identify roof members and state their functions 4.2.5 Know the difference between single roofs and double roofs 4.2.6 Sketch and describe types of eaves treatment 4.2.7 Understand the setting out of roofs, sequence of operation and erection. 4.2.8 Understand the treatment to valley and gutters 4.2.9 Sketch the various types of roofs and label all parts.
5.0	DOORS	5.1. Construction of doors	5.2.1 Name and describe types of doors 5.2.2 State the operations involved in hanging a door 5.2.3 Draw the horizontal and vertical sections of various types of doors

CERTIFICATE TWO – TRADE THEORY

TASK		CRITICAL SKILLS	SKILLS
			5.2.4 Sketch a section through a door opening and indicate the following : <ul style="list-style-type: none"> • Door • Architrave Door lining 5.2.5 Prepare material and cutting list of a given job e.g table, chair, door, etc.
6.0	WOOD WORKING MACHINES AND THEIR SAFETY	6.1 Description of types of wood working machine and their functions	6.2.1 Describe the types of woodworking machines their functions. 6.2.2 Identify parts of woodwork machines, sketch and label the parts. Eg. <ul style="list-style-type: none"> • Section through a combined planer • Section through circular saw • Part elevation of circular saw blade • Section of circular saw blade 6.2.3 Sketch push stick and push block 6.2.3 State the safety rules regarding the use of each woodwork machine 6.2.4 list and state the functions of safety guard used on machines

CERTIFICATE TWO – TRADE THEORY

TASK		CRITICAL SKILLS	SKILLS
7.0	GLAZED DOORS AND WINDOWS	<p>7.1.2 Description of glazed door with aluminium frame</p> <p>7.1.2 Process of Fabrication aluminium frame work</p> <p>7.1.3 Fittings used on aluminium framed doors/windows</p> <p>7.1.4 Tools/equipment for fabrication</p> <p>7.1.5 Advantages and disadvantages of aluminium framed glazed doors/windows</p>	<p>7.2.1 Describe glazed door/window with aluminium frame</p> <p>7.2.2 Describe the process of fabricating the frame work and fixing the glass</p> <p>7.2.3 List fittings which are fixed on aluminium glazed doors/windows and explain their functions e.g hinges, screws, locks, pivots, door closers, rollers etc.</p> <p>7.2.4 List tools/equipment use for fabrication of aluminium framed glazed door. Eg. Portable drill, screw driver, mitre square, radial arm saw etc.</p> <p>7.2.5 State advantages and disadvantages of glazed door/window with aluminium frame</p>
8.0	DISPOSAL OF WOOD, ALUMINIUM AND GLASS RESIDUE (WASTE)	<p>8.1.2 Wood residue</p>	<p>8.2.1 Describe the most appropriate method of disposing wood residue (waste) without causing harm in the community and the environment</p> <p>8.2.2 Describe the most appropriate method of disposing aluminium residue (waste) without causing harm in the community and the environment</p> <p>8.2.3 Discuss the most appropriate method of disposing pieces of broken glass without causing harm in the community and the environment</p> <p>8.2.4 State the effects of in-appropriate disposal of waste or residue on the environment</p>

CERTIFICATE TWO – TRADE DRAWING

TASK		CRITICAL SKILLS	SKILLS
1.0	SETTING OUT	1.1 Setting out of a small building	1.2.1 Draw the lay out of profile boards 1.2.2 Draw the cross section of a profile board in relation to trench and brick work and indicate width of wall and width of trench
2.0	SYMBOLS AND ABBREVIATIONS	2.1 Recommended drawing symbols and abbreviations for building materials 2.2. Abbreviations and their meaning used in the building industry	2.2.1 List and draw recommended symbols for building materials e.g brick, glass, metal, screed, stone, concrete, hardcore , earth etc. 2.2.2 State abbreviations and their meanings. Eg. Airbrick (AB) Hardwood (hwd) Asbestos (abs) joist (jst) etc.
3.0	ORTHOGRAPHIC PROJECTION	3.1. Orthographic projection to oblique	3.2.1 Draw given objects in 1 st and 3 rd angle projection e.g Wood block, bench hook etc. and change them into oblique projection.
4.0	ELEVATIONS AND SECTIONS	4.1. Drawing of elevations and sections of doors and windows	4.2.1 With a given scale, draw a standard panel door and indicate the following: <ul style="list-style-type: none"> • Front elevation • Vertical section • Horizontal section
5.0	SURFACE DEVELOPMENT	5.1 Surface Development of solids	5.2.1 Draw the plan and elevation plan of a given object and develop the surface. Eg. Square pyramid, cone, prism cylinder 5.2.2 Develop truncated objects.e.g truncated cone etc.
6.0	ROOFING BEVELS AND TRUE LENGTH	6.1.1 Determination of roof bevels and true lengths	6.2.2 Draw plan and elevation of a given roof and show the following <ul style="list-style-type: none"> • Seat cut of a common rafter • Plumb cut of a common rafter • Backing bevel of hip rafter • Edge cut of hip rafter • Side cut of purlin

			• Edge cut of purlin
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CERTIFICATE TWO – TRADE DRAWING

TASK		CRITICAL SKILLS	SUB-SKILLS
		6.1 Development of roof surface	6.2.1 Draw plan and elevation of a given roof and develop the surface and indicate the following: True length of common rafter True length of hip rafter True length of jack rafter Edge cut jack rafter
7.0	Designing	7.1.1 Designing and drawing	7.2.1 Explain the term “designing” 7.2.2 State the process of designing and explain with examples E.g <ul style="list-style-type: none"> • Situation • Brief • Investigation • Solutions • Realization • Testing • Evaluation 7.2.3 Design an artifact to solve a problem under the following situations <ul style="list-style-type: none"> • Classroom e.g table, chair, cupboard • Sitting room – T.V. cabinet, centre table • Kitchen e.g kitchen cabinet, kitchen stool 7.2.4 Produce the working drawing and details of the item designed

CERTIFICATE TWO – SCIENCE AND CALCULATIONS

TASK		CRITICAL POINTS	SUB-POINTS
1.0	S.I UNITS	1.1 Calculation involving mass, forces, length, time and weight	1.2.1 Solve calculations that involve mass, forces, length, time and weight.
2.0	BENDING MOMENTS	2.1 Calculation involving forces on beam	2.2.1 Solve problems involving forces acting on a beam (R1&R2)
3.0	MACHINE CUTTER SPEED	3.1.1 Calculation involving machine cutters speed	3.2.1 Solve problems involving the speed of machine cutters e.g circular saw blade, band saw pulley, cutter, block for surfacer etc.
4.0	MATERIAL ESTIMATE	4.1 Calculation of material for projects	14.2.1 Calculate the materials required for a given project. Eg. Ceiling, floors, tables, chairs, roof, doors etc.
5.0	PYTHOGORAS' THEOREM	5.1 Application of Pythagoras theorem	5.2.1 Use pythagora's theorem to solve for adjacent opposite and hypotenuse of a given right-angle triangle
6.0	PULLEYS	6.1 Types of pulleys and calculation involving pulleys	6.2.1 Define pulley 6.2.2 State and sketch types of pulleys and indicate the effort and load 6.2.3 understand and solve calculations involved in pulleys
7.0	LEVERS	7.1 Definition and types of levers	7.2.1 Define lever 7.2.2 State and explain types of levers with sketches 7.2.3 Solve problems involving the principle of operation of levers
8.0	DECAY OF TIMBER	8.1.1 Causes of decay in timber 8.1.2 Wood destroying fungi	8.2.1 State and explain causes of decay in timber 8.2.2. State factors that may lead to fungal attack on wood. E.g damp timber, poor ventilation 8.2.3 Explain the causes of dry rot and wet rot in timber 8.2.4 Explain the processes of eradicating dry rot and wet rot in timber 8.2.5 List common species of wood boring insects and explain their life-cycle

CERTIFICATE TWO – TRADE PRACTICAL

TASK		CRITICAL SKILLS	SUB-SKILLS
1.0	MAINTENANCE OF SAWS	1.1. Explanation of processes involved in saw maintenance	1.2.1 Explain the operations involved in maintaining a worn out saw. Eg. Topping shaping, setting and sharpening. 1.2.2 Demonstrate the processes to re-condition a worn-out saw
2.0	REPAIRS TO DAMAGED DOORS AND WINDOWS	2.1 Check for damages for doors/widows	2.2.1 Identify damages on doors and windows in use 2.2.2 Identity possible causes 2.2.3 Suggest possible solutions 2.2.4 Carry out the necessary repairs
3.0	DOORS AND WINDOWS	3.1 Construction of doors and windows	3.2.1 Construct doors and windows to a given specifications E.g panel door, battened door, louvered door, jalousie window, glazed window etc.
4.0	PORTABLE POWER TOOLS	4.1 Demonstration of the use of portable power tools	4.2.1 Practice the use of powered tools E.g portable circular saw “ Jig saw “ Power drill “ Orbital sander “ Belt sander “ Planer “ Jointer “ Router etc.
5.0	FORMWORK	5.1. Construction of formwork	5.2.1 Construct formwork for square column, formwork for window sill, formwork for beam and floor semicircular arch centre, segmental arch centre etc.
6.0	Roofs	6.1 Construction of roofs	6.2.1 Construct gable roof, hip roof and truss roof
7.0	Ceiling	Construction of ceiling	7.2.1 Construct ceilings by using different types of materials. Eg. T&G wooden profile boards. T&G plastic (panelit)

CERTIFICATE TWO – TRADE PRACTICAL

TASK		CRITICAL SKILLS	SUB-SKILLS
8.0	Aluminium framed glazed doors and windows	8.1. Fabrication of aluminium framed doors and windows	8.2.1. Fabricate aluminium framed doors and windows such as Sliding doors and windows Swing doors and windows Pivoted windows etc.
9.0	Floors	9.1. Construction of upper floor	9.2.1 Construct upper floor showing herringbone and solid structing
10.0	Final projects	10.1 Construction of items for final practical assessment	10.2.1 Select one of the following items for final project work assessment <ul style="list-style-type: none"> • Table and chair • Panel door • Bedstead with side cabinet Note: All items should have transparent finishing

RECOMMENDED TEXT BOOKS

NO	TITLE OF BOOK	AUTHOR	YEAR OF PUBLICATION	PUBLISHERS
1.	Carpentry & Joinery for Building Craft Students. Book 1 & 2	Peter Bret	1982	Hutchison Group (SA) (Pty) Led Bergulei 2012, South Africa
2.	Carpentry and Joinery 2 nd Edition	George Mitchell	1997	Wellington House, 125 Strand, London WC 2R OBB, England
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6.	Carpentry & Joinery	W.B. Mckay		
7.	Carpentry and Joinery	Brian Porter		
8.	Carpentry and Joinery	By George Love		
9.	Craft Technology for Carpenters & Joiners	By Frank Helton		