CURRICULUM

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Shuttering Carpenter

(A Competency Based, Short-term Curriculum)

Council for Technical Education and Vocational Training

CURRICULUM DEVELOPMENT DIVISION

Sanothimi, Bhaktapur

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Introduction

The competency based and market oriented curriculum for **Shuttering Carpenter** is designed to produce employable workforce equipped with knowledge, skills and attitudes related to the occupation. In this curriculum, the trainees will practice skills of shuttering in the training workshop and building construction industries. Once the trainees acquired the competencies they will have ample opportunity for employment and self-employment through which they will contribute in the national streamline of poverty reduction in the country. The skills and knowledge included in this curriculum improve their knowledge and skills and make them competent shuttering carpenters needed for the occupation. *The* ***major feature of the curriculum is to incorporate the drop-out youths who have only primary level schooling experience.***

Aim

The main aim of this program is to produce employable **shuttering carpenters** who could provide form work erecting and dismantling services in the construction industries in the country and abroad.

Objectives

After completion of training the trainees will be able to:

1. Develop the concept of shuttering
2. Perform bench work related to shuttering
3. Identify and prepare various elements of shuttering
4. Perform members erection in horizontal and vertical alignment
5. Erect formwork for different foundations
6. Perform formwork erection for shear wall
7. Perform formwork erection for column, beam and slab in separately and combinable situation
8. Dismantle various types of erected formworks after used
9. Apply simple mathematical technique related occupation
10. Be familiar with First Aid and HIV/AIDS
11. Be familiar with occupational health and apply safe working technique
12. Apply Communication and Small Enterprise Development skills

Course Description

This curricular programme is based on the job required to be performed by a **Shuttering Carpenter.** Therefore, this curriculum is designed to provide knowledge and skills on erecting wooden and steel formworks related to the occupation. This course deals with Concept of shuttering, Tools and equipment needed, Elements of shuttering and Preparation of various elements. This course especially, imparts skills and knowledge on various types and patterns of formwork erections required by the structural components such as beam, slab and column. Moreover, it also provides skills on dismantlement of erected formworks. *It also includes Applied mathematics, Occupational health and safety, First aid, HIV/AIDS, Communication and Small Enterprise Development as sub modules under common module with the view to impart fundamental skills for livelihood.*

Trainees will practice & learn skills using typical tools, equipment, machines and materials necessary for the program.

Duration
The total duration of the course extends over 434 hours

Target Group
The target group for this training program will be all interested individuals with educational prerequisite of minimum class five pass. Preference will be given to the individuals of rural, poor, female, Dalit, Janjati, Disadvantaged Groups (DAGs) and conflict affected people.

Target location
The target group for this training program will be all over Nepal.

Group Size
The group size of this training program will be maximum 30, provided all necessary resources to practice the tasks/ competencies as specified in this curriculum.

Medium of Instruction
The medium of instruction for this program will be Nepali or English or both

Pattern of Attendance
Trainee should have 90% attendance during the training period to get the certificate.

Focus of Curriculum
This is a competency-based curriculum. This curriculum emphasizes on competency performance. 80% time is allocated for performance and remaining 20% time is for related technical knowledge. So, the main focus will be on performance of the specified competencies in the curriculum.

Entry Criteria
Individuals who meet the following criteria will be allowed to enter this curricular program:

- Minimum of five class pass or equivalent
- Physically and mentally fit
- Minimum of 16 years of age
- Should pass entrance examination

Instructional Media and Materials
The following instructional media and materials are suggested for the effective instruction and demonstration.

- ***Printed Media Materials*** (Assignment sheets, Case studies, Handouts, Information sheets, Individual training packets, Procedure sheets, Performance Check lists, Textbooks etc.).
- ***Non-projected Media Materials*** (Display, Models, Flip chart, Poster, Writing board etc.).
- ***Projected Media Materials*** (Opaque projections, Overhead transparencies, Slides etc.).
- ***Audio-Visual Materials*** (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- ***Computer-Based Instructional Materials*** (Computer-based training, Interactive video etc.).

Teaching Learning Methodologies
The methods of teaching for this program will be a combination of several approaches. Such as Illustrated Lecture, Group Discussion, Demonstration, Simulation, Guided practice, Practical experiences, Fieldwork and Other Independent learning.

- Theory: Lecture, Discussion, Assignment, Group work.
- Practical: Demonstration, Observation, Guided practice and Self-practice.

Follow up Provision

First follow up: Six months after the completion of the program

Second follow up: Six months after the completion of the first follow up

Follow up cycle: In a cycle of one year after the completion of the second follow up for five years

Students Evaluation Details

- Continuous evaluation of the trainees' performance is to be done by the related instructor/ trainer to ensure the proficiency over each competency under each area of the whole course.
- Related technical knowledge learnt by trainees will be evaluated through written or oral tests as per the nature in the institutional phase of training.
- Trainees must secure minimum marks of 60% in an average of both theory and practical evaluations.
- The entrance test will be administered by the concerned training institute.

Trainers' Qualification (Minimum)

- Diploma in civil engineering or equivalent in related field
- Good communicative and instructional skills
- Experience in related field

Trainer-Trainees Ratio

- In theory classes 1(trainer): 30 (trainees)
- In practical classes (in workshop and laboratory) 1(trainer): 10 (trainees)

Suggestions for Instruction

1. **Select objectives**
   - Write objectives of cognitive domain.
   - Write objectives of psychomotor domain.
   - Write objectives of affective domain
2. **Select Subject matter**
   - Study subject matter in detail.
   - Select content related to cognitive domain.
   - Select content related to psychomotor domain.
   - Select content related to affective domain.
3. **Select Instructional Methods**
   - Teacher centered methods: like lecture, demonstration, question answers inquiry, induction and deduction methods.
   - Student initiated methods like experimental, field trip/excursion, discovery, exploration, problem solving, and survey methods.
   - Interaction methods like discussion, group/team teaching, microteaching and exhibition.
   - Dramatic methods like role play and dramatization
4. Select Instructional method (s) on the basis of objectives of lesson plans and KAS domains.
5. Select appropriate educational materials and apply at right time and place.
6. Evaluate the trainees applying various tools to correspond the KAS domains.
7. Make plans for classroom / field work / workshop organization and management.
8. Coordinate among objectives, subject matter and instructional methods.
9. Prepare lesson plan for theory and practical classes.
10. Deliver /conduct instruction / program.
11. Evaluate instruction/ program.

Special suggestion for the performance evaluation of the trainees

1. Perform task analysis.
2. Develop a detail task performance checklist.
3. Perform continuous evaluation of the trainees by applying the performance checklist.

Suggestion for skill training

1. Demonstrate task performance in normal speed.
2. Demonstrate slowly with verbal description of each and every step in the sequence of activity of the task performance using question and answer techniques.
3. Repeat 2 for the clarification on trainees demand if necessary.
4. Perform fast demonstration of the task.

Provide trainees the opportunities to practice the task performance demonstration

1. Provide opportunity to trainees to have guided practice.
2. Create environment for practicing the demonstrated task performance.
3. Guide the trainees in each and every step of task performance.
4. Provide trainees to repeat and re-repeat as per the need to be proficient on the given task performance.
5. Switch to another task demonstration if and only trainees developed proficiency in the task performance.

Other suggestions

1. Apply principles of skill training.
2. Allocate 20% time for theory classes and 80% time for task performance while delivering instructions.
3. Apply principles of learning relevant to the learners' age group.
4. Apply principles of intrinsic motivation.
5. Facilitate maximum trainees' involvement in learning and task performance activities.
6. Instruct the trainees on the basis of their existing level of knowledge, skills and attitude.

Certificate Requirements

Training institute itself provides certificate of **"Shuttering Carpenter"** to those trainees who successfully complete all the requirements as prescribed by the curriculum.

Skill Testing Provision

The graduates who have the completion certificate of "**Shuttering Carpenter**" may sit in the skill testing examination of **Level one (Level- 1)** as provisioned and administered by the National Skill Testing Board.

Physical Facilities

The theory class rooms at least should have area of 10 square feet per trainee and in the workshop it should be at least of 30 square feet per trainees. All the rooms and laboratory should be well illuminated and ventilated.

Well equipped workshop with adequate space	*1 (No.)*
Well furnished class room with adequate space	*1 (No.)*
Office room equipped with modern facilities	*1 (No.)*
Principal room equipped with modern facilities	*1 (No.)*
Reception room equipped with modern facilities	*1 (No.)*

Tools and Equipment

1. Marking gauge
2. Measuring tape
3. Mallet
4. Claw hammer
5. Cross cut saw
6. Rip saw
7. Compass saw
8. T- bevel
9. Combination square
10. Scratch awl
11. Plumb bob
12. Butt gauge
13. Hand drill
14. Adze (Basila)
15. Chisel (Different size)
16. Pencil
17. L square
18. Line level (Mason's Thread)
19. Carpenter's level
20. Bar clamp
21. Jumper (Craw Bar)
22. Pincer (Jambo)
23. Nail puller
24. Nail punch
25. Pliers
26. Tri-square
27. Hammer
28. File (Saw Sharpening triangular type)
29. Power Saw
30. Saw Set (Pliers type)

Course Structure of Shuttering Carpenter

Part A. Specialized module

S.N.	Module	Nature	Time (hrs)
1	Shuttering Carpentry	T+P	339
	Total		**339**

Part B. Common module

S.N.	Sub-modules	Nature	Time (hrs)
1	Applied Mathematics	T+P	28
2	Occupational Health & Safety	T+P	10
3	First Aid & HIV/AIDS	T+P	7
4	Communication	T+P	10
5	Small Enterprise Development	T+P	40
	Total		**95**
	Grand total (Part A & B)		**434**

Part A: Specialized Module

Shuttering Carpentry

Description:
This module intends to provide knowledge and skills on erecting wooden and steel formworks related to the occupation. This module deals with Concept of shuttering, Tools and equipment needed, Elements of shuttering and Preparation of various elements. This module especially, imparts skills and knowledge on various types and patterns of formwork erections required by the structural components such as beam, slab and column. Moreover, it also provides skills on dismantlement of erected formworks

Tasks:

1. Explain the concept of shuttering
2. Follow safety measures
3. Identify/enumerate/handle tools and equipment used for shuttering
4. Perform measuring/marking work
5. Identify elements of structure and shuttering/ interpret working drawing
6. Perform sawing/cross cutting using hand saw/power saw
7. Perform nailing on wooden members
8. Identify shuttering material for different purpose/ member
9. Lengthen wooden member (as props, joists, bearing plate etc) using butt joint
10. Lengthen wooden member (as props, joists, bearing plate etc) using half lap joint
11. Lengthen wooden member (as props, joists, bearing plate etc) using lap joint
12. Erect member in horizontal and vertical alignment
13. Check the level of erected member using pipe level and spirit level
14. Assemble member at right angle to each other by tri-square
15. Erect post
16. Prepare formwork for sides of different shapes. (Rectangular, Square, Semicircular, Circular etc.)
17. Erect formwork for different types of foundation (Isolated, Strap, Combined etc.)
18. Erect formwork for rectangular/square column
19. Erect form work for shear wall
20. Erect shuttering for beam and slab (same level, different level/copla)
21. Erect shuttering for cantilever beam and slab
22. Erect shuttering for circular column
23. Erect shuttering for arch lintel/arch slab
24. Erect shuttering for staircase (Dog-legged)
25. Dismantle beam/column/slab shuttering
26. Erect shuttering for a slab using steel member
27. Perform layout of column of structure
28. Maintain shuttering tools and materials

Task Analysis

Task No. 1 Explain the concept of shuttering.

Time: 2 hrs
Theory: 2 hrs
Practical: hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Define shuttering. 2. Describe importance of shuttering. 3. Enlist functions of shuttering. 4. State types of shuttering. 5. Explain the results of good and bad shuttering works. 6. State general safety precautions in shuttering work. 7. Keep records.	**Condition (Given):** Class room OHP, transparency, white board and marker, book and handouts, Powerpoint presentation **Task (What):** Explain the concept of shuttering. **Standard (How well):** Concept of shuttering explained.	➢ Concept of shuttering ➢ Shuttering and its use ➢ Function of shuttering ➢ Types of shuttering. ➢ General safety precautions rules in shuttering works

Required tools/equipment:
Safety:

Task Analysis

Task No. 2 Follow safety measures.

Time: 4 hrs
Theory: 2 hrs
Practical: 2 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1 Select personal protective equipment (PPE) as required 2 Wear required safety devices 3 Inspect and maintain safe work area 4 Follow established procedures for the use and care of tools 5 Follow established procedures for the use and care of equipments 6 Follow established procedures for the use and care of power operated equipment 7 Follow established procedures for the use and care of safety equipments 8 Enlist safety signs/notice. 9 Enlist preparation for emergency response. 10 Identify basic first-aid procedures 11 Lift objects and materials in accordance with established procedures	**Condition (Given):** Class room OHP, transparency, white board and marker, handouts and safety poster **Task (What):** Orient with safety rues Follow safety measures. **Standard (How well):** Safety rules and regulation oriented. Safety measures followed in sequential order.	➢ Definition of safety ➢ Safety rules and regulations ➢ Important of safety ➢ Important of occupational safety ➢ Workshop hazards ➢ Personal and workshop safety rules and regulations ➢ Safety sign and notice ➢ Emergency response ➢ First Aid

Tools/equipment: Safety sign and notice
Safety:

Task Analysis

Task No: 3 Identify/enumerate/handle tools and equipment used for shuttering.

Time: 7 hrs
Theory: 1 hr
Practical: 6 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Identify/enumerate tools and equipment used in shuttering Measuring tape, mallet, craw bar, claw hammer, cross cut saw, rip saw, plumb bob, hand drill, Adze (basila), pencil, spirit level, water level, pincer (Jambo), nail puller, pliers, tri-square, hammer, files, saw set, portable power saw etc. 4. Explain their use and function. 5. Explain safety and precaution while using them. 6. Identify Handle and enumerated tools and equipment. 7. Explain safety and maintenance of those tools and equipment. 8. Keep records.	**Condition (Given):** Workshop, various tools, equipment and materials needed for formworks **Task (What):** Identify/enumerate/handle tools and equipment used for shuttering. **Standard (How well):** Tools and equipment used in shuttering identified, enumerated and handled.	➢ Different tools and equipment used in shuttering and their functions ➢ Identification procedure ➢ Care and maintenance of tools and equipment, ➢ Safety and precautions in handling tools

Required tools/equipment: All tools and equipment are to be displayed

Safety: Handle tools & equipment properly

Task Analysis

Task No: 4 Perform measuring/marking work.		Time: 4 hrs Theory: 1 hr Practical: 3 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Confirm system of measurement to be applied. 4. Obtain work piece/s to be measured. 5. Able to convert the units, measure dimensions (length/breadth/height) of work piece in (Inch, feet / centimeter, millimeter, meter) using rule/tape. 6. Mark the point by using scriber or pencil. 7. Prolong the mark up to required length. 8. Check the straightness of the prolonged marks (Using thread) 9. Restore tools and materials. 10. Keep records.	**Condition (Given):** Workshop Necessary tools, equipment and materials **Task (What):** Perform measuring/marking work. Handle measuring and marking tools and equipment. **Standard (How well):** Work piece measured and marked. Measuring tools and equipment handled Dimensions of work piece measured. Marking tools and equipment handled.	➢ Measurement system ➢ Conversion of units ➢ Marking system ➢ Identification of different measuring and marking tools and equipment ➢ Procedure of measuring ➢ Safety precautions

Tools/equipment: Marking scriber, Measuring tape
Safety:

Task Analysis

Task No: 5 Identify elements of structure and shuttering/ interpret working drawing.		Time: 20 hrs Theory: 4 hr Practical: 16 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect working drawing and detail drawing. 3. Identify elements of structure as foundation, plinth beam, floor beam, shear wall, column, lintel, slab etc. 4. Interpret basic concept of these structural shuttering elements and their functions. 5. Interpret these elements in the working drawing. 6. Keep records.	**Condition (Given):** Workshop Main drawing of structure and working drawings and calculator **Task (What):** Identify elements of structure and shuttering/interpret working drawing. **Standard (How well):** Elements of structure identified and working drawing interpreted.	➢ Elements of structure ➢ Elements of shuttering ➢ Functions of different structural elements ➢ Concepts of working drawing and detail drawing ➢ Procedure

Tools/equipment: Teaching notes, main drawing, working drawing, marker, board, OHP
Safety:

Task Analysis

Task No. 6 Perform sawing/cross cutting using hand saw/power saw.		Time: 7 hrs Theory: 2 hr Practical: 5 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions.. 2. Collect necessary tools, equipment and materials. 3. Mark on the work piece as per drawing. 4. Clamp or hold the work piece. 5. Collect and fix hacksaw blade on hacksaw. 6. Saw on the work piece. 7. Check filling surface level and perpendicular using Back Square. 8. Measure the final dimension. 9. Clean work place. 10. Restore tools and materials. 11. Keep record.	**Condition (Given):** Workshop, necessary tools, power hand saw, equipment and materials **Task (What):** Perform sawing/cross cutting using hand saw. **Standard (How well):** Work piece sawn. Work piece cross cut Surface level checked and maintained. Final dimension measured.	➢ Concept of sawing, cross cutting ➢ Identification of different tools of sawing ➢ Procedure ➢ Safety precautions

Required tools/equipment: Rip saw, Cross cut saw, File, Marking scriber, Measuring tape, Steel scale

Safety:

- Handle saw properly.
- Clamp the work piece properly.

Task Analysis

Task No: 7. Perform nailing on wooden members.

Time: 3 hrs
Theory: 1 hr
Practical: 2 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Obtain finished work piece. 4. Mark layout line on the work piece. 5. Select appropriate nail as per material. 6. Hold the work piece. 7. Perform nailing. 8. Clean the work pieces it. 9. Measure the dimension of work pieces according to the drawing. 10. Restore tools and materials. 11. Keep records.	**Condition (Given):** Clean workshop, necessary tools(crew bar, nail gun, nail extractor), equipment and materials **Task (What):** Perform nailing on wooden members. Handle work pieces. **Standard (How well):** Nailing on wooden members performed. Hammer handled, Accuracy & finishing checked and maintained.	➢ Importance of nailing and its function ➢ Size of nail ➢ Procedure of nailing ➢ Safety precautions

Tools/equipment: Nail, Hammer, Steel rule and Scriber

Safety:

- Hold the work piece perfectly.
- Use safety Gloves.
- Follow general safety rules.

Task Analysis

Task No. 8 Identify shuttering material for different purposes / members.

Time: 4 hrs
Theory: 2 hr
Practical: 2 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Obtain a detailed drawing of the structure. 4. Describe the quality and strength of the shuttering materials. 5. Identify shuttering materials for different structural elements and members such as materials for beams, columns, slabs, shear wall etc. 6. Keep records.	**Condition (Given):** Workshop or site, detailed drawing and various shuttering materials. **Task (What):** Identify elements of shuttering material for different purposes / members. **Standard (How well):** Different shuttering materials for different purposes identified.	➢ List of members of shuttering work ➢ Functions of each shuttering member ➢ Requirement of quality and strength of each members/ materials ➢ Identification procedure

Required tools/equipment: Detailed drawing of each element of shuttering, marker / Chalk, board etc.
Safety: safety boots, safety helmets for site visit

Task Analysis

Task No: 9 Lengthen wooden members (as props, joists, bearing plate etc.) using butt joint.

Time: 7 hrs
Theory: 1 hr
Practical: 6 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Measure the total length of the member. 4. Mark for the butt joint in the members to be joined as per required measurement. 5. Saw the members as per required measurement. 6. Nail in the joints. 7. Check the straightness. 8. Restore tools and materials. 9. Keep records.	**Condition (Given):** Workshop or site, drawing, necessary tools, equipment and materials **Task (What):** Lengthen wooden members (as props, joists etc.) using half lap joint. **Standard (How well):** Wooden members lengthened using butt joint. Straightness checked and maintained.	➢ Concept of lengthening and joining ➢ Sawing the members ➢ Nailing the members ➢ Checking the straightness ➢ Procedure ➢ Safety precautions

Tools/equipment: Measuring tape, hammer, Saw, Pencil, Tri-square

Safety:

- Handle sharpen tools properly.

Task Analysis

Time: 8 hrs
Theory: 2 hr
Practical: 6 hrs

Task No: 10 Lengthen wooden members (as props, joists, bearing plate etc.) using half lap joint.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Measure the total length of the member. 4. Mark for the half lap joint in the members to be joined as per required measurement. 5. Saw the members as per marking. 6. Nail in the joints. 7. Check the straightness. 8. Restore tools and materials. 9. Keep records.	**Condition (Given):** Workshop or site, drawing, necessary tools, equipment and materials **Task (What):** Lengthen wooden members (as props, joists etc.) using half lap joint. **Standard (How well):** Wooden members lengthened using half lap joint. Straightness checked and maintained.	➢ Concept of lengthening and joining ➢ Sawing the members ➢ Nailing the members ➢ Checking the straightness ➢ Procedure ➢ Safety precautions

Tools/equipment: Measuring tape, hammer, Saw, Pencil, Tri-square

Safety:

- Handle sharpen tools properly.

Task Analysis

Time: 8hrs
Theory: 2 hr
Practical: 6 hrs

Task No: 11. Lengthen wooden members (as props, joists, bearing plate etc.) using lap joint.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Measure the total length of the member. 4. Mark for the lap joint in the members to be joined as per required measurement. 5. Saw the members as per marking. 6. Nail in the joints. 7. Check the straightness. 8. Restore tools and materials. 9. Keep records.	**Condition (Given):** Workshop or site, drawing, necessary tools, equipment and materials **Task (What):** Lengthen wooden members (as props, joists etc.) using half lap joint. **Standard (How well):** Wooden members lengthened using lap joint. Straightness checked and maintained.	➢ Concept of lengthening and joining ➢ Sawing the members ➢ Nailing the members ➢ Checking the straightness ➢ Procedure ➢ Safety precautions

Tools/equipment: Measuring tape, hammer, Saw, Pencil, Tri-square

Safety:

- Handle sharpen tools properly.

Task Analysis

Task No. 12 Erect members in horizontal and vertical alignment.

Time: 7 hrs
Theory: 1 hr
Practical: 6 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Select the appropriate material. 2. Collect necessary tools, equipment and materials. 3. Measure and mark the material. 4. Saw the material as per measurement 5. Check the straightness of the work piece using mason thread 6. Nail wooden strip if necessary. 7. Check with spirit level or pipe level for horizontal members and plum bob and tri-square for the vertical members. 8. Restore tools and materials. 9. Keep records.	**Condition (Given):** Workshop or site, drawing, necessary tools, equipment and materials **Task (What):** Erect members in horizontal and vertical alignment **Standard (How well):** Member erected straight on the horizontal and vertical alignment.	➢ Selecting the appropriate material ➢ Methods of marking ➢ Method of sawing ➢ Checking with spirit level and plumb line ➢ Procedure ➢ Safety precautions ➢ Mason Thread

Required tools/equipment: Hack saw for cutting, Hammer, Tape, Marking pencil Working Bench with clamps
Safety: wear the safe gloves

Task Analysis

Task No. 13 Check the level of erected member using pipe & spirit level.

Time: 10 hrs
Theory: 2 hr
Practical: 8 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect necessary tools, equipment and materials. 2. Fill water in the transparent pipe of diameter about 8mm. 3. Check the presence of air bubble inside the pipe. 4. Check whether the level of the water in the pipe is same or not. 5. Fix an end of the pipe level at the edge of the surface of which horizontality is to be checked. 6. Transfer the level on the other side of the surface adjusting the pipe level or spirit level (horizontal, vertical & 45^0). 7. Use wooden strip for the support if necessary. 8. Check it if equal or not. 9. Restore tools and materials. 10. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials, Pipe, Water. **Task (What):** Check the level of erect member using pipe level **Standard (How well):** Level of erected members checked using pipe level. The level of erected members maintained.	➢ Concept level ➢ Use of pipe level ➢ Use of wooden for support ➢ Procedure ➢ Safety precautions

Required tools/equipment: Transparent pipe, water, Hand saw or power saw for cutting wooden member, Hammer.
Safety: Wear safety material.

Task Analysis

Time: 10 hrs
Theory: 2 hr
Practical: 8 hrs

Task No: 14 Assemble members at right angle to each other by tri-square.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect necessary tools, equipment and materials. 2. Erect the assembled member. 3. Check the right angle of the junction. 4. Restore tools and materials. 5. Keep records.	**Condition (Given):** Construction site, necessary tools, equipment and materials **Task (What):** Assemble members at right angle to each other. **Standard (How well):** Members at right angle to each other assembled. Assembled members checked and maintained.	➢ Assemble of the member ➢ Checking of bottom line of each member ➢ Right angle of each member on the assembly ➢ Use of L-square/tri-square ➢ Procedure ➢ Safety precautions

Required tools/equipment: Tri-Square, tape, marking pencil etc.
Safety:

Task Analysis

Task No. 15 Erect post.

Time: 7 hrs
Theory: 1 hr
Practical: 6 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain the working drawing. 2. Collect necessary tools, equipment and materials. 3. Select appropriate material (prop with wedged blocks). 4. Mark the material as per drawing. 5. Saw the material as per required length. 6. Join the material by using nail of appropriate size. 7. Check joint for the perpendicularity. 8. Erect the post and check it by plumb bob. 9. Keep records.	**Condition (Given):** Construction site necessary tools, equipment and materials **Task (What):** Erect post. **Standard (How well):** Post erected Erected post kept truly vertical.	➢ Selecting the appropriate material. ➢ Concept of marking and sawing. ➢ Concept of bottom line ➢ Concept of right angle ➢ Procedure ➢ Safety precautions

Required tools/equipment: Bottom, try square Hammer, Pencil etc
Safety:

Task Analysis

Task No. 16 Prepare formwork for sides of different shapes. (Rectangular, Square Semicircular, Circular etc.)

Time: 14 hrs
Theory: 2 hrs
Practical: 12 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain the working drawing. 2. Collect necessary tools, equipment and materials. 3. Study the drawing for the shape of the formwork. 4. Select appropriate material. 5. Calculate the peripheral length of the side for fixing the side of the formwork with semi circular type. 6. Mark the material as the required size as per drawing. 7. Saw the material as per required length. 8. Fix the formwork as per marking and drawing 9. Provide necessary support. 10. Measure and mark the thickness as required. 11. Check the final measurement with the help of measuring tape. 12. Clean the working place. 13. Restore tools and materials. 14. Keep records.	**Condition (Given):** Construction site, drawing necessary tools, equipment and materials **Task (What):** Prepare different shape of form work. (Rectangular, Square, Semicircular, Circular etc.) **Standard (How well):** Right angle checked. Flatness checked. Dimension checked as per shape.	➢ Selecting the appropriate material. ➢ Concept of geometrical shape ➢ Use of drawing material as per different shape ➢ Concept of Marking and sawing ➢ Concept of bottom line ➢ Concept of right angle ➢ Procedure ➢ Safety precautions ➢ Measuring tape.

Required tools/equipment: Bottom, try square Hammer, Pencil etc
Safety: Handle Sharpen tools properly.

Task Analysis

Task No. 17 Erect formwork for different types of Foundation (Isolated, Strap, combined etc.)

Time: 14 hrs
Theory: 2 hrs
Practical: 12 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Study the drawing. 4. Extend column center line from profile board. 5. Fix the center of a column from two side line extension, 6. Extend sides of column foundation from each profile board to find sides of the pad. 7. Plumb from the sidelines extension to find sides of column foundation pad. 8. Square the column foundation pad sides now with Builders Square or by measuring diagonals. 9. Prepare sides member of the pad shuttering with plain timber of not less than 20mm thick. 10. Put two sides longer than the sides of the pad but other two sides must be just equal to the remaining sides of pad. 11. Adjust brackets outside the sides to erect and strengthen the sides. 12. Measure the diagonal of the square of the sides to check square ness. 13. Check the depth of the sides that the concrete has to form. 14. Mark with nails at sides the height or thickness of concrete to be formed. 15. Apply spacer from top of sides to keep correct size and strengthening the sides also. 16. Restore tools and materials. 17. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect formwork for different types of Foundation (Isolated, Strap, combined etc.) **Standard (How well):** Different type of foundation erected as per drawing. All the erected horizontal and vertical members checked.	➢ Building profiles (Setting the center lines according to drawing) ➢ Center lines fixing using building profiles ➢ Plumb bob and its application ➢ Use of bracket to strengthen sides ➢ Use of spacers to hold sides ➢ Marking of thickness of concrete ➢ Procedure ➢ Safety precautions

Required tools/equipment: Crosscut saw, folding tape, lines (cotton thread), Hammer, Pencil etc
Safety: * Use safety boots, helmets etc.

Task Analysis

Task No. 18 Erect formwork for rectangular/square column.

Time: 7 hrs
Theory: 1 hr
Practical: 6 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Fix the centers and sides of the columns. 4. Make starters of about 100mm high from the pad or slab or from where the columns have to erect for each column with the help of centering the columns and their sides. 5. Ensure that re-bars for the columns have been correctly placed and fixed before erecting shuttering for the columns. 6. Make cubes from cement concrete equal thickness to side covers with tying binding wires on it. 7. Tie them on the stirrups from outside so that the cubes rest on sides of the shuttering. 8. Prepare colors at least two for each column to hold the sides vertical from outsides. 9. Prepare sides to give the widths of the columns of required heights making the two sides right angles, 10. Erect each right-angled part resting against the starter and maintain verticality. 11. Adjust right-angled sides making forma for the column and put colors from outside and tighten it. 12. Plumb all the sides of the forma, if possible from inside and if not from outside to ensure verticality of the columns. 13. Restore tools and materials. 14. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect formwork for column rectangular/square column. **Standard (How well):** Formwork for column erected. All the erected members checked.	➢ Centering and side fixing techniques for columns ➢ Plumbing techniques ➢ Colors and starters ➢ Cubes for cover to provide in columns, slabs and beams ➢ Procedure ➢ Safety precautions

Required tools/equipment: Cross cut saw, Hammer, Folding tape, Crow bar, Nails, Line and Pins, Spirit level, Chisels, Rammers etc.
Safety: Ensure the verticality of all four sides of the column forma is ensured.

Task Analysis

Task No. 19 Erect formwork for a shear wall.

Time: 13 hrs
Theory: 1 hr
Practical: 12 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Prepare sides for both side of the given wall if it has two sides or one as the case may be, for a wall as given in drawing. 4. Prepare ledgers to hold the sides together. 5. Prepares timber-shoring members to hold the sides of wall. 6. Prepare wooden cleats to hold the shoring members in position on top of concrete. 7. Prepare re-bar spacers equal to the thickness of wall, to provide in between two sides of the wall. 8. Put re-bar spacers at adequate distances simply to maintain wall thickness. 9. Erect sides of the wall standing right on its position and make it truly vertical. 10. Fix the side now with shoring members which rest on cleat on floor nailed into concrete. 11. Provide ledgers at top and middle so that shoring member can rest of them. 12. Do the same for the other side of the wall. 13. Check once again the verticality of the sides and wall thickness gap in between the sides. 14. Restore tools and materials. 15. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect shuttering for a wall. **Standard (How well):** Shuttering for a wall erected. All the erected horizontal and vertical members checked.	➢ Function of ledger ➢ Function of shoring ➢ Functions of cleats ➢ Techniques of erecting shuttering sides of a wall ➢ Safety precautions

Required tools/equipment: Cross cut saw, Folding tape, Pencil, Axe, Basila, Hammer, etc.
Safety: Ensure that the sides of the shuttering stand strong and upright while concreting and compacting.

Task Analysis

Task No. 20 Erect shuttering for beam and slab (same level, different level/copla) # Project work (Field Visit)

Time: 30 hrs
Theory: 2 hrs
Practical: 28 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Prepare props with toping and wedges or sole plates if required. 4. Prepare sides and bottom for beams, 5. Prepare bottoms for slab, 6. Erect props to support bottom of beams, 7. Erect sides of the beams truly vertically, 8. Make the joints of bottom and sides of beams watertight and right-angled, 9. Erect props for supporting bottoms of slab/copla, 10. Make the bottom leveled and the junction of bottom and sides watertight, 11. Mark the top of the slab and beam on the sides/copla. 12. Make that the sides stand upright strongly by providing side supports. 13. If the levels of the slab are different in the same floor such as sunk slab, bottom of the slab formwork shall be fixed as per drawing. 14. Restore tools and materials. 15. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect shuttering for a slab and beam. **Standard (How well):** Shuttering for a slab and beam using timber and steel members erected. All the erected horizontal and vertical members checked.	➢ Use of steel props with screws and bolts ➢ Uses of topping props for supporting sides of beams/ slabs. ➢ Uses of plywood for bottom and cutting techniques, ➢ Importance of level and level checking ➢ Providing depths of slabs and beams as required. ➢ Procedure ➢ Safety precautions

Required tools/equipment: Pliers, Crow bars, Picks, Shovels, Measuring tape, Water level pipe, Spirit level, Cross cut saw, Hammer, Nails and Basila
Safety: Wear safety boots and safety helmets.

Task Analysis

Task No. 21 Erect shuttering for cantilever beam and slab
 # Project work (Field Visit)

Time: 19 hrs
Theory: 1 hr
Practical: 18 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Prepare props with toping and wedges or sole plates if required. 4. Prepare sides for beams, columns, slab, and cantilever. 5. Prepare bottoms for beams, slabs and cantilever. 6. Prepare collars for columns. 7. Prepare cubes of end cover sizes. 8. Prepare starters for columns. 9. Erect props at the ends of beams. 10. Put bottom on top of toping of props. 11. Provide intermediate props too, 12. Fix bottoms of cantilever beams, slabs. 13. Fix sides of cantilever beams, slab 14. Use brackets to fix beam sides. 15. Use side spacer for a beam if necessary. 16. Mark the height of the beam on its sides, 17. Put bottoms of slab on top of timber beam placed on flange of props. 18. Ensure the props are adequate to support working people on it. 19. Proved bottoms of cantilever on timber beam which has rested on toping / flange of props. 20. Mark the top of the finishing product on sides of beam/ slab/ cantilever. 21. Ensure that props have been adequately provided to bear working people' load, materials load etc. 22. Restore tools and materials. 23. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect shuttering for a cantilever beam and slab. **Standard (How well):** Shuttering for cantilever beam and slab is erected as per drawing. All the erected horizontal and vertical members checked.	➢ Levels of slab, beam and cantilever (refer previous tasks) ➢ Columns heights and slab or beam junction ➢ Procedure ➢ Safety precautions

Required tools/equipment: Cross cut saw, Folding tape, Pencil, Axe, Basila, Hammer etc.
Safety: Junction is a crucial part of structure and is usually difficult in making shuttering, so work in group.

Task Analysis

Task No. 22 Erect formwork for circular column.

Time: 12 hrs
Theory: 1 hr
Practical: 11 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Fix the centers and study the drawing for sides of the circular column. 4. Take a timber plank of thickness1.5"- 2". The size of the plank shall be of rectangular in shape with length 4" more than the diameter of the circular column and width 2" more than the radius of the column. 5. Draw the semi circle in the plank with required radius (radius of the column plus the thickness of the timber strips to be nailed for the side of the column) 6. Cut the plank in the marking. Nail a number strip of size 2" X 1" in the semi circular frame spaced at 0.9m c/c. Two pieces of this semi circular formwork are required to make a complete circle. 7. Make starters of about 100mm high from the pad or slab or from where the columns have to erect for each column with the help of centering the columns and their sides. Starter shall be made with same technology as of formwork. 8. Ensure that re-bars for the columns have been correctly placed and fixed before erecting shuttering for the columns. 9. Make cubes from cement concrete equal thickness to side covers for re-bars with tying binding wires on it. 10. Tie them on the stirrups from outside so that the cubes rest on sides of the shuttering. 11. Erect the prepared semi circular formwork resting against the starter and maintain verticality. Obtain two bolts and nuts, long enough to cover the board size and for tightening the clamp. Clamp the formwork and provide necessary supports. 12. Plumb the sides of the formwork, if possible from inside and if not from outside to ensure verticality of the columns. 13. Restore tools and materials. 14. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect formwork for circular columns. **Standard (How well):** Shuttering for circular columns erected as per supplied drawing All the erected members checked.	➢ Centering and side fixing techniques for columns ➢ Plumbing techniques ➢ Colors and starters ➢ Cubes for cover to provide in columns, slabs and beams ➢ Procedure ➢ Safety precautions

Required tools/equipment: Cross cut saw, Hammer, Folding tape, Crow bar, Nails, Line and Pins, Spirit level, Rammers etc.

Safety: Ensure the verticality of all four sides of the column forma is ensured.

Task Analysis

Task No. 23 Erect shuttering for arch lintel/arch slab.

Time: 17 hrs
Theory: 1 hr
Practical: 16 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Obtain a wooden board of 25mm (1") thick. 4. Draw semicircle on it. 5. Saw using compass saw along the semicircle mark on the board to remove outside parts of the semicircle. 6. Provide a number of this type of arch @ 0.9m c/c or as per requirement along the arch 7. Fix a thin waterproof plywood on the semicircle. 8. Provide necessary support for it. 9. Restore tools and materials. 10. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect formwork for arch lintel/ arc slab. **Standard (How well):** Shuttering for arch lintel and arc slab erected as per supplied drawing. All the erected horizontal and vertical members checked.	➢ Concept of geometrical shapes ➢ Marking the work piece as per drawing ➢ Procedure ➢ Safety precautions ➢ Concept of starting and ending point of waist slab and landing.

Required tools/equipment: Cross cut saw, Hammer, Folding tape, Crow bar, Nails, Line and Pins, Spirit level, Rammers etc.
Safety: Ensure the earth below beam is well compacted and consolidated,

Task Analysis

Task No. 24 Erect shuttering for staircase (doglegged).

Time: 30 hrs
Theory: 1 hr
Practical: 29 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain working drawing. 2. Collect necessary tools, equipment and materials. 3. Study the drawing (plan & section). 4. Mark the landing height. Fix the shuttering for the landing at required height and width. 5. Fix the shuttering for the waist slab of the stair as per drawing. 6. Calculate the size of the tread and riser as per drawing. 7. Fix the side of the waist slab with ply wood. Mark the riser and tread in the sides of the waist slab as per calculation 8. Fix the planks as riser marked in the sides. Check the riser and tread with spirit level & pipe level. 9. Plumb the sides of the waist slab using plumb bob. 10. Restore tools and materials. 11. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect shuttering for staircase. Check width/ rise/ tread/ straightness of sofit. **Standard (How well):** Shuttering for staircase erected as per drawing. Width, rise, tread and straightness of sofit checked.	➢ Centering and side fixing techniques for staircase ➢ Plumbing techniques ➢ Riser and treads ➢ Waist slab ➢ Procedure ➢ Safety precautions

Required tools/equipment: Cross cut saw, Hammer, Folding tape, Crow bar, Nails, Line and Pins, Spirit level, Chisels, Rammers etc.
Safety: Ensure the verticality of all four sides of the column forma is ensured.

Task Analysis

Task No. 25 Dismantle beam/column/slab shuttering # Project work (Field Visit)

Time: 24 hrs
Theory: 1 hr
Practical: 23 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment and materials. 3. Apply ladder / trestle or scaffolding if it is already there. 4. Remove those last members fix during erecting. 5. Put the unfixed member in a proper place. 6. Remove sides for a beam at first. 7. Remove upper collars of columns at first specially after 48 hrs. 8. Remove sides of slabs at first. 9. Remove bottoms of beams and slab only after 21 days of curing. 10. Remove bottom of slab first after removing bottom of beams. 11. Remove alternative props of slab, 12. Remove alternative props of beam also. 13. Restore tools and materials. 14. Keep records.	**Condition (Given):** Erected shuttering at site, necessary tools, equipment and materials **Task (What):** Dismantle beam/column/slab shuttering. **Standard (How well):** Beam, column, slab shuttering removed.	➢ Time for strength development of various concrete ➢ Safety precautions in handling shuttering members ➢ Stacking of dismantled members of shuttering ➢ Procedure ➢ Safety precautions

Required tools/equipment: Claw hammer, Crow bar, Chisel etc.
Safety: Safety boots, safety helmets, safety precautions

Task Analysis

Task No. 26 Erect shuttering for a slab using steel members
 # Project work (Field Visit)

Time: 25 hrs
Theory: 1 hr
Practical: 24 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Inspect the steel members for shuttering like channel beam, props, steel plates etc. 2. Study drawing for the specification required for shuttering. 3. Collect required number of props @ at least two for a channel beam. 4. Collect required number of steel plates based upon the size of the plate and the area to have shuttering. 5. Collect required number of steel channel for the area. 6. Mark the distance at which steel channels have to be erected. 7. Erect steel props on the lines supporting steel channel on which steel plates rest. 8. Ensure that the props have base plates so that it does not be inserted. 9. Adjust height of the props to fit the plate's surface for the sofit of the ceiling by screwing up or down and holding by the bolt of the prop. 10. Prepare timber board for the area not covered by steel plates because of the size of the plates. 11. Block the holes if any found on the surface made by plates. 12. Restore tools and materials. 13. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Erect shuttering for a slab using steel members. **Standard (How well):** Shuttering for a slab using steel members erected as per drawing. All the erected horizontal and vertical members checked.	➢ Use of steel props with screws and bolts ➢ Use of steel props elongated by sliding and hooking the members with bolts ➢ Procedure ➢ Safety precautions

Required tools/equipment: Pliers, Crow bars, Picks, Shovels, Measuring tape, Water level pipe, Spirit level, Cross cut saw, Hammer, Nails and Basila
Safety: Wear safety boots and safety helmets.

Task Analysis

Time: 16 hrs
Theory: 2 hrs
Practical:14 hrs

Task No. 27 Perform layout of column of structure.
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Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Obtain the drawing and study it. 2. Fix a baseline of the structure. 3. Mark the center line and edge line of the column with the reference of base line. 4. Project the perpendicular from the center point of the column in the base line by 3-4-5 method. 5. Mark the position of other columns as per drawing. 6. Check the perpendicularity by 3-4-5 method or tri-square. 7. Project grid of the column beyond the construction area and a number of permanent pegs shall be fixed for the further requirements. 8. Restore tools and materials. 9. Keep records.	**Condition (Given):** Construction site drawing, necessary tools, equipment and materials **Task (What):** Perform layout of structure. **Standard (How well):** Layout of the structure performed as per supplied drawing. Accuracy checked.	➢ Interpretation of the working drawing ➢ Method of base line fixing ➢ Method of checking the perpendicular ness of layout ➢ Method of centerline fixing ➢ Safety precautions

Required tools/equipment: Pliers, Crow bars, Picks, Shovels, Measuring tape, Water level pipe, Spirit level, Cross cut saw, Hammer, Nails and Basila
Safety: Wear safety boots and safety helmets.

Task Analysis

Task No. 28 Maintain shuttering tools & materials.

Time: 10 hrs
Theory: 1 hr
Practical: 9 hrs

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Clean the tools properly after use. 2. Sharpen the tools periodically as per requirement. 3. Wipe out the tools with oiled cloth before storing. 4. Store properly in a dry places. 5. Clean wastage shuttering materials from the sites in proper place. 6. Store unused nails properly.	**Condition (Given):** Placement store , necessary tools, equipment **Task (What):** Maintain shuttering tools. **Standard (How well):** All the shuttering tools maintained as per requirements.	➢ Method of sharpening of tools ➢ Method of maintain tools ➢ Procedure ➢ Safety precautions

Required tools/equipment: Pliers, Crow bars, Picks, Shovels, Measuring tape, Water level pipe, Spirit level, Cross cut saw, Hammer, Nails and Basila
Safety: Wear safety boots and safety helmets.

Part: B Common Module

Description:
This module consists of skills and knowledge related to applied math, occupational health and safety, HIV/AIDS, first aid, communication, and small business management applicable in the related job performances.

Objectives:

- Carry out simple mathematical calculations related to the occupation
- Be familiar with hazards related to this occupation
- Apply preventive measures for occupational health and safety
- Apply first aid measures
- Apply preventive measures for HIV/AIDS
- Communicate with others
- Apply skills of small business management

Sub modules:

1. Applied math
2. Occupational health and safety
3. First aid & HIV/AIDS
4. Communication
5. Small business management

Sub module 1: Applied Mathematics

Description:
It consists of skills and knowledge related to mathematical calculations applicable in the related occupational performances.

Objective:

- To carry out simple mathematical calculations that must be done for the effective performance in the occupational job.

Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:

				Th.(4 hrs) + Pr.(24hrs) = Tot.(28 hrs)	Time(hrs)	
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Carry out simple addition applicable in job situation		<u>Addition</u>**:** ➢ Concept ➢ Simple calculations ➢ Application in the occupation	0.2	0.8	1
2.	Carry out simple subtraction applicable in job situation		<u>Subtraction</u>: ➢ Concept ➢ Simple calculations ➢ Application in the occupation	0.2	0.8	1
3.	Carry out simple multiplication applicable in job situation		<u>Multiplication</u> ➢ Concept ➢ Simple calculations ➢ Application in the occupation	0.2	0.8	1
4.	Carry out simple division		<u>Division</u>:	0.2	0.8	1

	applicable in job situation		➢ Concept ➢ Simple calculations ➢ Application in the occupation			
5.	Carry out measurements		Measurement: ➢ Concept ➢ Application in the occupation	0.2	1.8	2
6.	Convert units of measurement		Units of measurement**:** ➢ Concept ➢ Units of measurement ➢ Unit conversion ➢ application	0.2	1.8	2
7.	Convert units of measuring temperature		Units of measuring temperature: ➢ Concept ➢ Units of temperature measurement ➢ Unit conversion ➢ application	0.2	0.8	1
8.	Calculate area		Area**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	1.8	2
9.	Calculate volume		Volume**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
10.	Calculate weight		Weight**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
11.	Calculate percentage		Percentage**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
12.	Calculate ratio and proportions		Ratio and proportions**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
13.	Apply Pythagoras formula		Pythagoras formula**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	1.8	2
14.	Apply unitary method		Unitary method**:**	0.2	1.8	2

			➢ Concept ➢ Calculation ➢ Application			
15.	Calculate simple interest		Simple interest**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
16.	Calculate unit cost		Unit cost: ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
17.	Calculate per unit income		Per unit income: ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
18.	Calculate profit and loss		Profit and loss**:** ➢ Concept ➢ Formula ➢ Calculation ➢ Application	0.2	0.8	1
19.	Perform billing		Billing**:** ➢ Concept ➢ Calculation ➢ Bill format ➢ Procedure ➢ Application	0.2	2.8	3
20.	Prepare simple balance sheet		Balance sheet: ➢ Concept ➢ Format ➢ Procedure ➢ Application	0.2	1.8	2
	Total:			**4**	**24**	**28**
	Sub module 2: Occupational Health and Safety					
	Description: It consists of skills and knowledge related to occupational health and safety applicable in the related occupational performances					
	Objectives: • To be familiar with hazards related to this occupation • To apply preventive measures for occupational health and safety					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(2 hrs) + Pr.(8hrs) = Tot.(10 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
Be familiar with hazards related to this occupation						
1.	Be familiar with accident hazards		Accident hazards: ➢ Concept	0.2	0.8	1

			➢ Causes ➢ Procedures for managing this hazard			
2.	Be familiar with physical hazards		Physical hazards: ➢ Concept ➢ Causes ➢ Procedures for managing this hazard	0.2	0.8	1
3.	Be familiar with chemical hazards		Chemical hazards: ➢ Concept ➢ Causes ➢ Procedures for managing this hazard	0.2	0.8	1
4.	Be familiar with biological hazards		Biological hazards: ➢ Concept ➢ Causes ➢ Procedures for managing this hazard	0.2	0.8	1
5.	Be familiar with ergonomic/psychological / organizational factors:		Ergonomic /psychological / organizational factors: ➢ Concept of : ▪ Ergonomic factors ▪ Psychological factors ▪ organizational factors ➢ Procedures for managing hazards caused by these factors	0.2	0.8	1
	Sub total:			**1**	**4**	**4**
Apply preventive measures for occupational health and safety						
1.	Ware safety wares		Safety wares: ➢ Identification ➢ Needs ➢ Wearing procedures	0.2	0.5	0.7
2.	Inspect workplace before working		Workplace inspection: ➢ Concept ➢ Principle and procedures ➢ Records keeping	0.2	0.5	0.7
3.	Inspect tools/materials/equipment before use		Inspection of tools/materials/equipment: ➢ Concept and identification ➢ Principle and procedures ➢ Records keeping	0.1	0.5	0.6
4.	Be prevented from accident hazards		Prevention of accident hazards: ➢ Concept ➢ Being prevented from accident hazards ➢ Records keeping	0.1	0.5	0.6
5.	Be prevented from physical		Prevention of physical hazards:	0.1	0.5	0.6

	hazards		➢ Concept ➢ Being prevented from physical hazards ➢ Records keeping			
6.	Be prevented from chemical hazards		Prevention of chemical hazards: ➢ Concept ➢ Being prevented from chemical hazards ➢ Records keeping	0.1	0.5	0.6
7.	Be prevented from biological hazards		Prevention of biological hazards: ➢ Concept ➢ Being prevented from biological hazards ➢ Records keeping	0.1	0.5	0.6
8.	Be prevented from ergonomic/psychological / organizational factors that create problems/hazards.		Prevention of ergonomic/psychological / organizational factors that create problems/hazards: ➢ Concept ➢ Being prevented from ergonomic/psychological / organizational factors that create problems/hazards ➢ Records keeping	0.1	0.5	0.6
	Sub total:			**1**	**4**	**5**
	Total:			**2**	**8**	**10**
	Sub module 3: First Aid and HIV/AIDS					
	Description: It consists of skills and knowledge related to first aid measures applicable in the related occupational performances.					
	Objective: • To **a**pply first aid measures					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(3 hrs) + Pr.(4hrs) = Tot.(7 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Carryout simple dressings		Carryout simple dressings: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
2.	Apply simple bandages		Apply simple bandages: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
3.	Apply first aid for simple		Apply first aid for simple	0.10	0.40	0.5

	wounds		wounds: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording			
4.	Apply first aid for heat /chemical burns		Apply first aid for heat /chemical burns: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
5.	Apply first aid for injuries/cuts		Apply first aid for injuries/cuts: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
6.	Apply first aid for fracture		Apply first aid for fracture: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
7.	Apply first aid for simple bleeding		Apply first aid for simple bleeding: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.10	0.40	0.5
8.	Apply first aid for insect bites		Apply first aid for insect bites: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25
9.	Apply first aid for animal bites		Apply first aid for animal bites: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25
10.	Apply first aid for frost bite		Apply first aid for frost bite : ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25

11.	Apply first aid for simple poisoning		Apply first aid for simple poisoning: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25
12.	Apply first aid for electrical shock		Apply first aid for electrical shock: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25
13.	Apply first aid for choking/ drowning		Apply first aid for choking/ drowning: ➢ Concept ➢ Needs ➢ Procedures ➢ Precautions ➢ Recording	0.05	0.20	0.25
14.	Concept & examples of HIV/AIDS		➢ Definition of HIV/AIDS ➢ Difference between HIV & AIDS ➢ Current status of global HIV/AIDS ➢ Sign & symptoms of AIDS & HIV in infected person. ➢ Using condom carefully and consistently during each act of sexual intercourse incase of other than single sex partner. ➢ Keeping away from sharing syringes, needles and other skin piercing instrument with HIV infected people ➢ Keeping away from sharing toothbrushes, blade razors or other instruments that could become contaminated from blood ➢ Keeping away from handling clothes or cloths that are visibly contaminated with blood ➢ Positive health behavior ➢ Getting blood be tested to ensure HIV negative/positive	1		

	Total:			**3**	**4**	**7**
	Sub module 4 : Communication					
	Description: It consists of the skills and knowledge related to communication in the related occupation. Each task consists of its steps, related technical knowledge and hour distribution.					
	Objectives: After its completion the trainees will be able:					
	• To handle telephone calls • To handle fax • To handle mail • To write letters • To write memos / tips / notes / notice • To perform internal communication • To perform external communication • To perform oral communication • To perform written communication		• To communicate with donors To communicate with financial institutes • To link with media • To disseminate information • Write job application • Prepare Resume. • Communicate with senior. • Communicate with juniors. • Deal with customers • Request / purchase tool, supplies, materials and equipment. • Fill up leave requisition form.			
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(2 hrs) + Pr.(8hrs) = Tot.(10 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Handle telephone calls		<u>Handling telephone calls</u>: ➢ Concept, need, and importance ➢ Operating principles and procedures ➢ Care and maintenance ➢ Safety precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
2.	Handle fax		<u>Handling fax:</u> ➢ Concept, need, and importance ➢ Operating principles and procedures ➢ Care and maintenance ➢ Safety precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
3.	Handle mail		<u>Handling mail:</u> ➢ Concept, need, and importance	0.1	0.4	0.5

			➢ Operating principles and procedures ➢ Care and maintenance ➢ Safety precautions to be taken ➢ Keeping activity records			
4.	Write letters		<u>Writing letters:</u> ➢ Concept, need, and importance ➢ Types of letter ➢ Component parts of each type of letter ➢ Format of each type of letter ➢ Writing letters ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
5.	Write memos / tips / notes / notice		<u>Writing memos / tips / notes / notice</u> : ➢ Concept, need, and importance ➢ Component parts of memos / tips / notes / notice ➢ Format of memos / tips / notes / notice ➢ Writing memos / tips / notes / notice ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
6.	Prepare simple report		<u>Preparing simple report</u>: ➢ Concept, need, and importance ➢ Component parts of a report ➢ Format of a report ➢ Writing a report ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
7.	Prepare simple proposal		<u>Preparing simple proposal</u>: ➢ Concept, need, and importance ➢ Component parts of a proposal ➢ Format of a proposal ➢ Writing a proposal ➢ Precautions to be taken	0.1	0.4	0.5

			➢ Keeping activity records			
8.	Perform internal/ external communication		<u>Performing internal/ external communication</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Performing internal/ external communication ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
9.	Perform horizontal/vertical communication		<u>Performing horizontal/vertical communication</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Performing horizontal/vertical communication ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
10.	Perform oral/ written communication		<u>Performing oral/ written communication</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Performing oral/ written communication ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
11.	Communicate with financial institutes		<u>Communicating with financial institutes</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Communicating with financial institutes ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
12.	Link with media		<u>Linking with media</u>: ➢ Concept, need, and importance	0.1	0.4	0.5

			➢ Principles, procedures, and application ➢ Linking with media ➢ Precautions to be taken ➢ Keeping activity records			
13.	Disseminate information		<u>Disseminating information</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Disseminating information ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
14.	Write job application		<u>Writing job application</u>: ➢ Concept, need, and importance ➢ Component parts of job application ➢ Format of job application ➢ Writing job applications ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
15.	Prepare resume		<u>Preparing resume</u>: ➢ Concept, need, and importance ➢ Component parts of a resume ➢ Format of a resume ➢ Writing resume ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
16.	Communicate with senior.		<u>Communicating with senior</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Communicating with senior ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
17.	Communicate with juniors.		<u>Communicating with juniors</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Precautions to be taken	0.1	0.4	0.5

			➢ Keeping activity records			
18.	Deal with customers/stake holders		<u>Dealing with customers/stake holders</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Communicating with juniors ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
19.	Request / purchase tool, supplies, materials and equipment.		<u>Requesting / purchasing tool, supplies, materials and equipment</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Requesting / purchasing tool, supplies, materials and equipment ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
20.	Fill up leave requisition form		<u>Filling up leave requisition form</u>: ➢ Concept, need, and importance ➢ Principles, procedures, and application ➢ Filling up leave requisition form ➢ Precautions to be taken ➢ Keeping activity records	0.1	0.4	0.5
			Total:	**2**	**8**	**10**

Sub module: 5 : Entrepreneurship Development

Total: 40 hrs

Theory: 18 hrs

Practical: 22 hrs

Course description

This course is designed to impart the knowledge and skills necessary for micro enterprise or a business unit of self-employment startup. The entire course intends to introduce enterprise, finding suitable business ideas and developing business idea to formulation of business plan.

Course objectives

After completion of this course, students will be able to:
1. Understand concept of enterprise and self-employment
2. Explore suitable business idea matching to self
3. Learn to prepare business plan
4. Learn to keep preliminary business record

S.N.	Task statements	Related technical knowledge	Time (hrs)		
			T	P	Tot.
1.	State the concept of business/enterprises	• Introduction to business/enterprise • Classification of business/enterprises • Overview of MSMEs(Micro, Small and Medium Enterprises) in Nepal • Cost & Benefits of self-employment/salaried job	4		4
2.	Grow entrepreneurial attitudes	• Wheel of success • Risk taking attitude	3		3
3.	Generate viable business ideas	• Business idea generation • Evaluation of business ideas	1	2	3
4.	Prepare business plan	• Concept of market and marketing • Description of product or service • Selection of business location • Estimation of market share • Promotional measures • Required fixed assets and cost • Required raw materials and costs • Operation process flow • Required human resource and cost • Office overhead and utilities • Working capital estimation and	9	18	27

S.N.	Task statements	Related technical knowledge	Time (hrs)		
			T	P	Tot.
		calculation of total finance required • Product costing and pricing • Cost benefit analysis (BEP, ROI) • Information collection method and guidelines • Individual business plan preparation and presentation			
5.	Prepare basic business records	• Day book • Payable & receivable account	1	2	3
		Total:	**18**	**22**	**40**

Textbook:

क) प्रशिक्षकहरुका लागि निर्मित निर्देशिका तथा प्रशिक्षण सामग्री, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद्, २०६९

Reference book:

Entrepreneur's Handbook, Technonet Asia, 1981

Reference Books

1 Galami T.B., *A Text Book of Construction (Part -I)*, CTEVT.

2 अधिकारी राजेन्द्र प्रसाद र के.सी. अर्जुन *भवन निर्माण,* प्रा.शि.तथा व्या.ता परिषद् २०५४ ।

3 Punmia B.C. Dr., *Building Construction* (Latest Edition).

4 Kumar Sushil *Building Construction* (Latest Edition).

5 Sharma S.K. & Kaul B.K., *Building Construction* (Latest Edition).

6 Singh Gurucharan, *Building Planning & Design* (Latest Edition).

7 Arya A.S., *Masonry and Timber Structure including Earth* (Latest Edition).

8 स्थापित चिनीकाजी, *प्रयोगात्मक काष्ठकार्यको सरलीकृत पाठ्यपुस्तक* (Latest Edition).

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