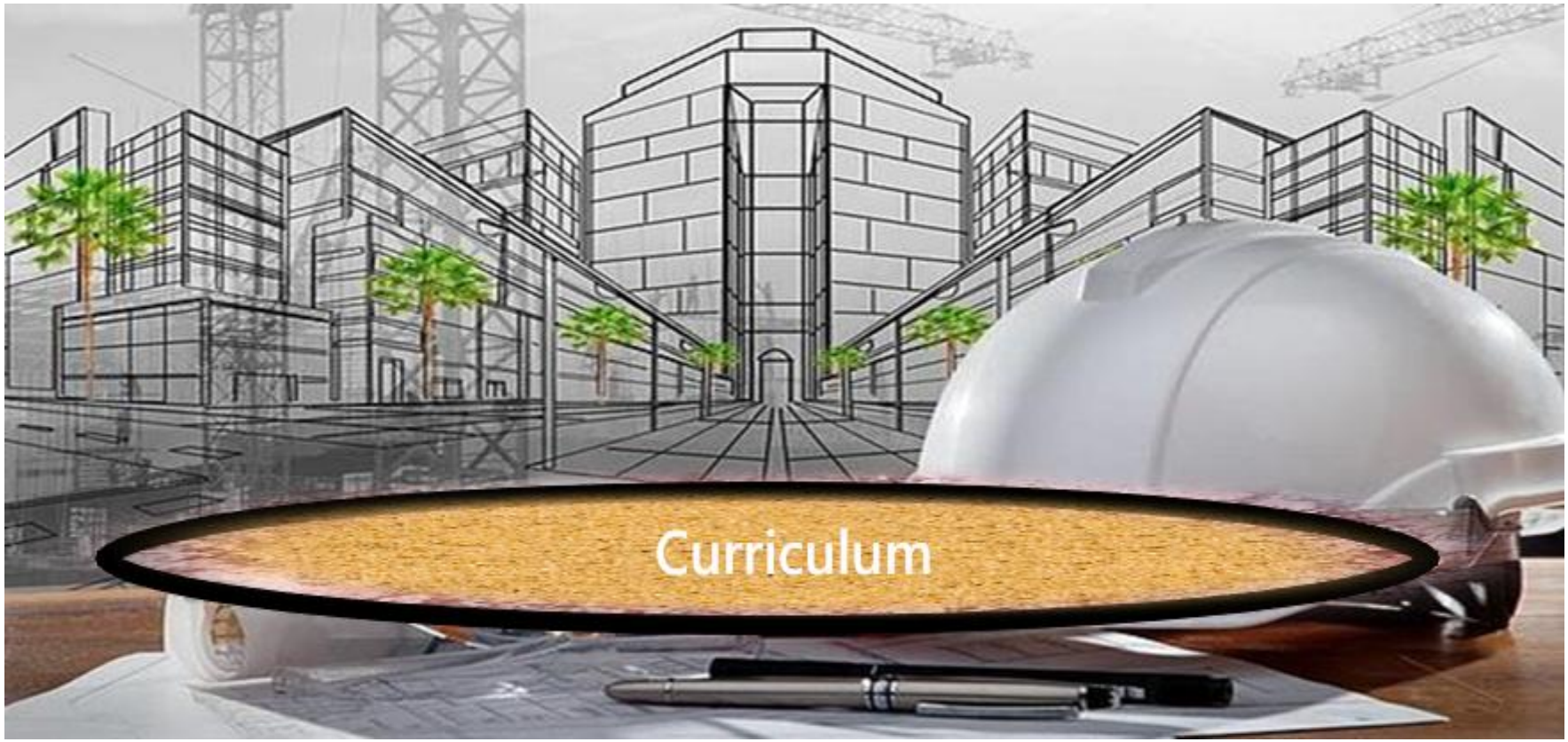
National Vocational Certificate Level 1 & 2 Site Assistant in Civil Technology



NATIONAL VOCATIONAL AND TECHNICAL TRAINING COMMISSION (NAVTTC)
GOVERNMENT OF PAKISTAN

Contents

1. Introduction

Civil engineering is considered as the first discipline of the various branches of engineering after military engineering, and includes the designing, planning, construction, and maintenance of the infrastructure. The works include roads, bridges, buildings, dams, canals, water supply and numerous other facilities that affect the life of human beings. Civil engineering is intimately associated with the private and public sectors, including the individual homeowners and international enterprises. It is one of the oldest engineering professions, and ancient engineering achievements due to civil engineering include the pyramids of Egypt and road systems developed by the Romans.

Civil engineering has a significant role in the life of every human being, though one may not truly sense its importance in our daily routine. The function of civil engineering commences with the start of the day when we take a shower, since the water is delivered through a water supply system including a well-designed network of pipes, water treatment plant and other numerous associated services. The network of roads on which we drive while proceeding to school or work, the huge structural bridges we come across and the tall buildings where we work, all have been designed and constructed by civil engineers. Even the benefits of electricity we use are available to us through the contribution of civil engineers who constructed the towers for the transmission lines. In fact, no sphere of life may be identified that does not include the contribution of civil engineering. Thus, the importance of civil engineering may be determined according to its usefulness in our daily life. Therefore, industry expectations for skilled workforce are also dynamic which can only be managed through setting relevant competency standards in collaboration with the leading industries. Being cognizant of this fact, National Vocational & Technical Training Commission (NAVTTC) developed competency standards for Civil Technology under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualifications Development Committee (QDC) and validated by the Qualifications Validation Committee (QVC) having representation from the leading Construction, Real States & Builder industry of the country.

2. Purpose of the Qualification:

The purpose of this qualifications is to set high professional standards for civil technology sector. The specific objectives of developing these qualifications are as under:

- Improve the professional competence of the trainees
- Provide opportunities for recognition of skills attained through non-formal or informal pathways

- Improve the quality and effectiveness of training and assessment for civil technology industry
- Enable the existing workforce to capacitate themselves in new technologies and methods

3. Overall objectives of training program

The Civil qualification of level 5 consists of both the theoretical and practical details and having the following Occupations

1. Civil Surveyor
2. Draftsman
3. Quantity Surveyor
4. Quantity Surveyor after Draftsman
5. Materials Technician
6. Construction Quality control Supervisor
7. Mason
8. Plumber
9. Domestic Electrician.
10. Site supervisor

4. Entry level of trainees

National Vocational Certificate Level 1 & 2 (Site Assistant in Civil Technology)	Middle
National Vocational Certificate Level 3 (Assistant Surveyor in Civil Technology)	Level 1 & 2
National Vocational Certificate Level 4 (Site Supervisor in Civil Technology)	Level 3
National Diploma in Civil Technology Level 5	Level 4

5. Minimum qualification for teachers

- B. Tech in Civil Technology 4 Years
- B.Sc. / B.E. in Civil Engineering 4 Years
- D. A. E. in Civil Technology with 3 Years teaching experience
- Must be able to communicate effectively

Medium of instruction

English, and Urdu.

6. Duration of the course:

The proposed curriculum is composed of **306 modules** that will be covered in **3600 Learning hours**. Duration of the course is proposed to be Three years. The total weightage for technical modules is 3600 hours. A total of 1200 hours have been reserved for allied subjects i.e. Islamic studies, English, Mathematics, Physics and Chemistry.

The details of technical modules are given as under:

Level 1- 2 = 6 months. (Single Semester)
Level - 3 = 6 months. (Single Semester)
Level - 4 = 1 Year. (Two Semesters)
Level - 5 = 1 Year. (Two Semesters)

The overall distribution of contact hours and Credit Hours is given below:

Total.	**3600 hours. & 360 Credits**
Theory.	**976 hours (27.11 %)**
Practical.	**2624 hours (72.89 %)**

The distribution of contact hours and credit hours in each level is given below:

Level 1- 2 = 6 months (16 weeks)

Total.	**592 hours. & 59.2 Credits**
Theory.	**128 hours (22 %)**
Practical.	**464 hours (78 %)**

Level - 3 = 6 months (16 weeks)

Total.	**608 hours. & 60.8 Credits**
Theory.	**128 hours (21 %)**
Practical.	**480 hours (79 %)**

Level - 4 = 1 Year (16 weeks + 16 Weeks)

Total.	**1200 hours. & 120 Credits**
Theory.	**240 hours (20 %)**
Practical.	**960 hours (80 %)**

Level - 5 = 1 Year (16 weeks + 16 Weeks)

Total.	**1200 hours. & 120 Credits**
Theory.	**480 hours (40 %)**
Practical.	**720 hours (60 %)**

7. Description and structure of the course

Following is the structure of the course:

(National Vocational Certificate Level 1 & 2 Site Assistant in Civil Technology)

Module Code	Competency Standard	Category	Level	Theory	Practical	Total	Credit Hour
	9.01 Basic Engineering Surveying			**32**	**160**	**192**	**19.2**
0732B&CE001	Perform Chain Survey	Core	2	4	9	13	1.3
0732B&CE002	Perform Compass Traversing	Core	2	4	15	19	1.9
0732B&CE003	Carry out Plane Table Survey	Core	2	4	12	16	1.6
0732B&CE004	Perform Levelling	Core	2	4	27	31	3.1
0732B&CE005	Perform Reciprocal Levelling	Core	2	2	21	23	2.3
0732B&CE006	Perform Long & Cross Sectioning	Core	2	2	22	24	2.4
0732B&CE007	Perform Tacheometry	Core	2	2	9	11	1.1
0732B&CE008	Perform Contouring	Core	2	2	18	20	2
0732B&CE009	Perform Hydrographic Survey	Core	2	6	15	21	2.1
0732B&CE010	Compute Volume by Contouring	Core	2	2	12	14	1.4
	9.02 Civil Engineering Drawing			**32**	**160**	**192**	**19.2**
0732B&CE011	Produce Templates, Title Block/ Strip & Draw Lines	Core	2	2	9	11	1.1
0732B&CE012	Perform Lettering And Printing On Sheet.	Core	2	2	9	11	1.1
0732B&CE013	Construct Scales for Drawing	Core	2	2	9	11	1.1

0732B&CE014	Construct Geometrical Figures	Core	2	2	9	11	1.1
0732B&CE015	Produce Orthographic Projections	Core	2	2	9	11	1.1
0732B&CE016	Perform Sectioning	Core	2	2	9	11	1.1
0732B&CE017	Perform Dimensioning On Drawings	Core	2	2	9	11	1.1
0732B&CE018	Produce Pictorial Drawings	Core	2	2	9	11	1.1
0732B&CE019	Develop Symbols of Engineering Drawings	Core	2	2	9	11	1.1
0732B&CE020	Produce Cross Section of Wall.	Core	2	2	9	11	1.1
0732B&CE021	Develop Building Drawings	Core	2	6	34	40	4
0732B&CE022	Perform House Planning	Core	2	2	9	11	1.1
0732B&CE023	Produce Layout Plans for Building Services.	Core	2	2	18	20	2
0732B&CE024	Produce Drawings of Sanitary Structures	Core	2	2	9	11	1.1
	9.03 Building Materials			**32**	**48**	**80**	**8**
0732B&CE025	Identify bricks	Core	2	4	6	10	1
0732B&CE026	Dress stone for masonry	Core	2	4	6	10	1
0732B&CE027	Prepare slaked lime	Core	2	2	2	4	0.5
0732B&CE028	Identify and store cement for construction	Core	2	4	6	10	1
0732B&CE029	Select sand for construction	Core	2	2	3	5	0.5
0732B&CE030	Identify ferrous and non-ferrous metals	Core	2	2	6	8	1
0732B&CE031	Identify advanced construction materials	Core	2	4	9	13	1
0732B&CE032	Work Safely in Construction Industry	Core	2	4	1	5	0.5
0732B&CE033	Interpret Simple Building Plans	Core	2	2	3	5	0.5
0732B&CE034	Read and Interpret plans and Specifications	Core	2	2	3	5	0.5

0732B&CE035	Apply power and hand tools in construction.	Core	2	2	3	5	0.5
	9.04 Workshop Practice-I (Wood Work)			**16**	**48**	**64**	**6.4**
0732B&CE036	Carry out OH & S requirement in workshop	Generic	2	2	3	5	0.5
0732B&CE037	Determine properties and types of locally manufactured timber	Generic	2	2	6	8	0.8
0732B&CE038	Sharpen carpentry tools	Core	2	1	6	7	0.7
0732B&CE039	Apply hand tools	Core	2	1	6	7	0.7
0732B&CE040	Perform wooden joinery work	Core	2	2	6	8	0.8
0732B&CE041	Apply fastenings	Core	2	1	3	4	0.4
0732B&CE042	Apply traditional spirits polishing techniques	Core	2	2	3	5	0.5
0732B&CE043	Apply portable power tools	Core	2	1	3	4	0.4
0732B&CE044	Make simple calculations of timber	Core	2	2	6	8	0.8
0732B&CE045	Construct a basic timber product	Core	2	2	6	8	0.8
	9.05. Workshop Practice-II (Electrical Wiring)			**16**	**48**	**64**	**6.4**
0732B&CE046	Carry out OH & S requirement in workshop	Generic	2	2	6	8	0.8
0732B&CE047	Maintain safety	Core	2	2	6	8	0.8
0732B&CE048	Perform electrical wiring	Core	2	3	9	12	1.2
0732B&CE049	Install electrical system	Core	2	3	9	12	1.2
0732B&CE050	Construct Circuits	Core	2	2	6	8	0.8
0732B&CE051	Measure properties of electricity	Core	2	2	6	8	0.8
0732B&CE052	Perform electrical wiring of a single room	Core	2	2	6	8	0.8

8. Scheme of Studies.

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Code	Name of Subjects	Category	Numbers of Module	Contact Hour			Credit	Periods per week		
				Th	Pr	Total		Th	Pr	Total
000000000	Basic Engineering Surveying	Technical	10	32	160	192	19.2	2	10	12
000000000	Civil Engineering Drawing	Technical	14	32	160	192	19.2	2	10	12
000000000	Building Materials	Technical	11	32	48	80	8	2	3	05
000000000	Workshop Practice-I (Wood Working)	Technical	10	16	48	64	6.4	1	3	4
000000000	Workshop Practice-II (Electrical Wiring)	Technical	07	16	48	64	6.4	1	3	4
00000000		Allied								
000000000		Allied								
Total			**52**	**128**	**464**	**592**	**59.2**	**8**	**29**	**37**

9. Detail of Modules Level wise

A. National Qualification Certificate in Civil Technology Level 2

9.1. Basic Engineering Surveying

0732C&BE-1: Perform Chain Survey

Objective: This module covers the knowledge and skills required to perform chainage offset and perform chain traversing survey by using the Engineer, meter chain and other different type of chains.

Duration: 13 Hours **Theory: 04 Hours** **Practice: 09 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Measure a Line	**Trainee will be able to:** • Identify appropriate chain to be used for chainage • Perform ranging of line by using ranging rods • Unfold chain to record chainage by identifying talley • Fold chain properly according to standards	• Chainage • Ranging of line • Chain Survey • Specifications of chains. • Types of chains • Procedure to fold and unfold the chain. • Procedure to read chainage	Theory-02 Hrs Practice-03 Hrs Total- 05 Hrs	Pencil Eraser Sharpener Notepad T&E Arrows Ranging Rods Chain (Engineer's, Gunter & Metric)	Class Room and Survey Field

		• Practical Activity • Measure a line by chain.			
LU2. Perform Chain survey	Trainee will be able to: • Select appropriate chain and ranging rods for chain survey • Mark station points which would cover area to be surveyed • Perform ranging of every line to be chainaged • Record chainage of every line of traverse. • Identify cross staff to take normal offsets • Record offsets of required points • Prepare map of area	• Traversing. • Cross staff with its types. • Offsets and their types. • Procedure to take offsets. • Procedure to plot chain survey on drawing sheet. • Practical Activity • Prepare a map by chain traversing.	Theory-02 Hrs Practice-06 Hrs Total- 08 Hrs	Pencil Eraser Sharpener Drawing Sheet Scotch Tape Pegs Ruler White Chalk T- Scale Protractor Compass Drafting Triangles T&E Arrows Ranging Rods Chain (Engineer's, Gunter & Metric) Measuring Tape Drawing table	Class Room, Survey Field and Drawing Hall

0732B&CE-2: Perform Compass Traversing

Objective: This module covers the knowledge and skills required to perform chainage offset and perform compass traversing survey by using the magnetic compass and different type of chains.

Duration: 19 Hours **Theory: 4 Hours** **Practice: 15 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Read Bearing by Compass	**Trainee will be able to:** • Identify compass and tripod stand to read bearing of line • Adjust compass on initial point of line by fixing and levelling of compass on tripod • Record bearing of line by sighting final point of line • Repeat procedure for back bearing by shifting compass at final point	• State the purpose and principles of compass traversing • State compass, its types, its parts and explain reading from it. • Define meridian and state its types • Practical Activity • Setting up the compass and observation of bearings.	Theory-02 Hrs Practice-06 Hrs Total- 08 Hrs	Pencil Eraser Sharpener Notepad Pegs White chalks T&E Arrows Ranging Rods Chain (Engineer's, Gunter & Metric) Compass Tripod	Class Room and Survey Field
LU-2. Perform Traversing by Compass	• Trainee will be able to: • Identify compass and tripod stand to read bearing of line • Mark station points which would cover area to be surveyed	• Define the traverse, bearing and types of bearing. • Solve problems relating to bearings	Theory- 02 Hrs Practice-09 Hrs Total- 11 Hrs	Pencil Eraser Sharpener Drawing Sheet Scotch Tape Pegs	Class Room, Survey Field and Drawing Hall

	• Record bearing of each line of traverse in terms of fore bearing and back bearing • Measure distance of each line by chain or tape • Compile data of traverse in tabular form • Check for local attraction in readings of bearings • Apply correction for any error in readings of bearings • Plot traverse on drawing sheet	• Define dip, declination & local attraction and solution of relevant problems. • State the types of traverse and explain methods of traversing. • State the methods of plotting compass traverse and adjustment of closing error. • Practical Activity • Perform compass survey and prepare traverse sheet.		Ruler White Chalk T- Scale Protractor Compass Drafting Triangles T&E Arrows Ranging Rods Chain (Engineer's, Gunter & Metric) Measuring Tape Compass Tripod Cross Staff Drawing Table	

0732B&CE-3: Carryout Plane Table Survey

Objective: This module covers the knowledge and skills required to perform plane Table Survey by Orientation, Radiation and intersection Method by using the plane table u-frame, plumb bob, Alidade, telescopic Alidade and Trough compass.

Duration: 16 Hours **Theory: 4 Hours** **Practice: 12 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-I. Carry out Plane Table Survey (By orientation)	**Trainee will be able to:** • Identify the instruments used in plane table surveying • Fix the table on tripod at given station point by using instrument • Check leveling & centering of the table • Fix Drawing Sheet & mark North by trough compass • Sight the objects by sight vane and measure distance • Perform the traversing by orientation by scale • Show the conventional symbols of objects on map	• Purpose and principles of plane table surveying and the functions of accessories used in plane table surveying. • Operations involved in setting-up plane table and the methods of orientation by back sighting and by Trough compass. • Conventional symbols with its importance. • Steps involved in carrying out plane table surveying by orientation method. • Merits and demerits of plane table surveying and the errors in plane	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Sharpener Drawing Sheet Scotch Tape Pegs Ruler White Chalk T&E Arrows Ranging Rods Measuring Tape Tripod Plane Table with clamp Plumbing Fork (U-Frame) Alidade Telescope Alidade Trough Compass Cross Staff	Class Room and Survey Field

		table surveying and precaution to be taken. • Practical Activity • Perform plane table survey by orientation method.			
LU-2. Carry out Plane Table Survey (By Radiation)	**Trainee will be able to:** • Identify the instruments used in plane table surveying • Adjust the table on tripod at suitable point from where all objects could be covered • Fix Drawing Sheet & Mark North by trough compass • Sight the objects by sight vane and measure distance • Draw traverse by scale with Radiation • Show conventional symbols of objects on map	• Steps involved in carrying out plane table surveying by radiation method. • Practical Activity • Perform plane table survey by radiation method.	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs	Pencil Eraser Sharpener Drawing Sheet Scotch Tape Pegs Ruler White Chalk T&E Arrows Ranging Rods Measuring Tape Tripod Plane Table with clamp Plumbing Fork (U-Frame) Alidade Telescope Alidade Trough Compass Cross Staff	Class Room and Survey Field

LU-3. Carry out Plane Table Survey (By Intersection)	• Trainee will be able to: • Identify the instruments used in plane table surveying • Mark base line which can be used for sighting the points from initial and final point of line • Adjust the table on initial point of base line • Fix Drawing Sheet & Mark North by trough compass • Sight the objects by sight vane and measure distance • Adjust the table on final point of base line • Sight the objects by sight vane and measure distance • Draw traverse by scale with Intersection • Show conventional symbols of objects on map	• Steps involved in carrying out plane table surveying by intersection method. **Practical Activity** • Perform plane table survey by intersection method.	Theory-02 Hr. Practice-03 Hrs Total-05 Hrs	Pencil Eraser Sharpener Drawing Sheet Scotch Tape Pegs Ruler White Chalk T&E Arrows Ranging Rods Measuring Tape Tripod Plane Table with clamp Plubing Fork (U-Frame) Alidade Telescope Alidade Trough Compass Cross Staff	Class Room and Survey Field

0732B&CE-4: Perform Levelling

Objective: This module covers the knowledge and skills required to perform Levelling, by using the different type of levelling instruments, Staff and chains.

Duration: 31 Hours **Theory: 04 Hours** **Practice: 27 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Determine height of instrument in Levelling	**Trainee will be able to:** • Identify levelling instrument and levelling staffs • Select appropriate level and staff for levelling • Identify temporary Bench Mark • Take B.S on Bench mark • Determine height of instrument	• Leveling • Purpose of leveling. • Technical terms, level line, level surface, datum, datum line, horizontal plane, vertical plane, Horizontal line, vertical line, level line, line of collimation, Axis of telescope, bubble tube axes, back sight, foresight, Intermediate sight, change point, station point. • Bench mark and its types Identify the parts and function of various types of tilting levels and Auto set level • Levelling staves and their uses.	Theory-01 Hrs Practice-09 Hrs Total- 10 Hrs	Pencil Eraser Field Book Sharpener Ruler T&E Calculator Measuring steel Tape Level Tripod Levelling staff	Class Room and Survey Field

		• Steps involved in performing temporary adjustment of a level. • Height of instrument **Practical Activity** Temporary Adjustment of Level Read different types of staves Determine height of instrument			
LU-2. Perform Simple Levelling	**Trainee will be able to:** • Select appropriate level and staff • Perform temporary adjustment of level • Observe staff reading on given Bench Mark • Record BS, IS & FS in field book • Calculate Reduced Level	• Reduced levels by rise & fall method and height of instrument method and recording the same on level book. **Practical Activity** Leveling of a line	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Field Book Sharpener Ruler T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff	Class Room and Survey Field
LU-3. Perform Differential Levelling	**Trainee will be able to:** • Select appropriate level and staff • Perform temporary Adjustment of level • Take readings on given Bench Mark with staff	• Differential levelling • Differential leveling procedures • Reduced levels by rise & fall method and height of instrument method and recording the same on level book.	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Field Book Sharpener Ruler T&E Calculator	Class Room and Survey Field

	• Record BS, IS & FS in Field Book • Calculate Reduced Levels • Apply arithmetic check	**Practical Activity** Differential Levelling		Measuring steel Tape Ranging rods Level Tripod Levelling staff	
LU-4. Carry out Fly Leveling	**Trainee will be able to:** • Select appropriate level and staff • Perform temporary Adjustment of level • Take readings on given Bench Mark with staff • Record BS, IS & FS in Field Book • Calculate Reduced Levels • Apply arithmetic check	• Fly levelling • Differential leveling procedures • Reduced levels by rise & fall method and height of instrument method and recording the same on level book. • Missing data of a level book page. **Practical Activity** Fly levelling and finding R.Ls by height of collimation and rise fall method.	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Field Book Sharpener Ruler T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff	Class Room and Survey Field

0732B&CE-5: Perform Reciprocal Levelling

Objective: This module covers the knowledge and skills required to determining the elevations, leveling between two widely separated points in which observations are made in both directions to eliminate the effects of atmospheric refraction and the curvature of the earth.

Duration: 23 Hours **Theory: 02 Hours** **Practice: 21 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Carry out Reciprocal leveling	• **Trainee will be able to:** • Select appropriate level and staff • Mark two reciprocal points • Perform temporary Adjustment near X point. • Observe staff readings on both points x and Y • Perform temporary Adjustment near y points • Calculate difference of both pair of staves readings. • Compare RL's of both points • Compute elevations	• Reciprocal leveling • Procedure for Reciprocal leveling • Numerical problem on reciprocal levelling • Practical Activity • Carry out reciprocal levelling	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Field Book Sharpener Ruler T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff	Class Room and Survey Field
LU2. Carry out Reciprocal Ranging	• Trainee will be able to: • Mark any two reciprocal points	• Reciprocal ranging • Procedure for Reciprocal ranging	Theory-0.5 Hrs Practice-06 Hrs Total- 6.5 Hrs	Pencil Eraser Field Book	Class Room and Survey Field

	• Range the points on line • Mark intermediate point on survey line • Observe ranging	• Practical Activity • Carry out reciprocal ranging		Sharpner Ruler T&E Calculator Measuring steel Tape Ranging rods	
LU3. Carry out Precise Levelling	• Trainee will be able to • Identify equipment • Use bar coded staff • Use infrared detector • Scanned staff image • Observe staff readings • Calculate RLs	• Precise leveling • Precautions in levelling operation. • Errors in levelling • Correction due to curvature and refraction • Practical Activity • Shifting of benchmark by precise leveling	Theory-0.5 Hrs Practice-09 Hrs Total- 9.5 Hrs	Pencil Eraser Field Book Sharpner Ruler T&E Calculator Measuring steel Tape Ranging rods Precise Level Tripod Levelling staff	Class Room and Survey Field

0732B&CE-6: Perform Long and Cross Sectioning

Objective: This module covers the knowledge and skills required to draw Cross sections, lines of levels or short profiles made perpendicular to the center line of the project. (For example, taking a cross section profile of a stream bed while doing a profile survey of the stream) Cross sections are usually taken at regular intervals and at sudden changes in the center-line profile. long sectioning and cross sectioning are required to calculate earthwork for roads, Railway track and earthen embankment.

Duration: 24 Hours **Theory: 02 Hours** **Practice: 22 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Perform Cross Sectioning	**Trainee will be able to:** • Adjust Level & Locate temporary bench mark. • Take readings every 25 feet interval of existing track (Transversely) • Observe first reading on BM and the center line • Observe staff reading on specific interval starting from center line to right & left sides and record in the field book	• Cross sectioning • Technical terms - Road chain age, cross fall, and road edge details • Procedures for taking readings to plot x-section • Practical Activity • Route Levelling along cross section	Theory-0.5 Hrs Practice-09 Hrs Total- 9.5 Hrs	Pencil Eraser Field Book Sharpener Ruler Pegs T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer	Class Room and Survey Field

	• continue staff readings on every RD of 25 ft with same pattern (Left & Right) of given line • Calculate Reduced Levels & Recheck by formula				
LU-2. Draw Cross Sections	**Trainee will be able to:** • Compile the data obtained from cross sectioning to plot the cross section • Fix drawing sheet on drawing table • Draw cross section	• Cross sectioning • Road chain age, cross fall, and road edge details • Procedures to plot x-section • Practical Activity • Prepare cross section drawing	Theory-0.5 Hrs Practice-03 Hrs Total- 04 Hrs	Pencil Eraser Drawing sheet Sharpner Ruler T- Scale Proteractor Compass Drafting Triangles T&E Drawing Table	Class Room and Drawing Hall
LU-3. Perform Long Sectioning	**Trainee will be able to:** • Locate temporary bench mark. • Establish stations every 30m /100 ft. interval of existing track (Longitudinally) • Observe first reading on temporary bench mark.	• Long sectioning • Road chainage and gradient. • Procedures for taking readings to plot L-section • Practical Activity • Route Levelling along long section	Theory-0.5 Hrs Practice-07 Hrs Total- 7.5 Hrs	Pencil Eraser Field Book Sharpener Ruler Pegs T&E Calculator	Class Room and Survey Field

	• Observe reading on specific interval (30m /100 ft) and record in the field book • Calculate Reduced Levels at the center line readings to plot the Longitudinal section			Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer	
LU-4. Draw Long Sections	**Trainee will be able to** • Compile the data obtained from long sectioning to plot the long section • Fix drawing sheet on drawing table • Draw cross section	• Long sectioning • Road chainage and gradient. • Procedures for taking readings to plot L-section • Practical Activity • Prepare long section drawing	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Pencil Eraser Drawing sheet Sharpener Ruler T- Scale Protractor Compass Drafting Triangles T&E Drawing Table	Class Room and Drawing Hall

0732B&CE-7: Perform Tachometry

Objective: This module covers the knowledge and skills required to workout vertical and horizontal distances by stadia cross hair using stadia constant.

Duration: 11 Hours **Theory: 02 Hours** **Practice: 09 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Find out Horizontal distance	• Trainee will be able to: • Adjust the level on station point from where distance is to be measured • Place staff on the point to where distance is to be measured • Record upper stadia lower stadia and cross hair readings. • Calculate horizontal distance by stadia tachometry	• Principles of tachometry and enlist the method of tachometry • Instruments used in stadia survey and state tachometric constants • Steps involved in taking stadia observations in field to distances of stations and compute horizontal distances. • Examples for finding horizontal and distances by tachometry **Practical Activity** Determination of horizontal distance by stadia tachometry	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs	Pencil Eraser Field Book Sharpner Ruler Pegs T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer	Class Room and Survey Field
LU-2. Find out Vertical distance	**Trainee will be able to:** • Adjust the level on station point from where distance is to be measured	• Steps involved in taking stadia observations in field to find elevations and compute the elevation.	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Field Book Sharpner Ruler	Class Room and Survey Field

	• Place staff on the point to where distance is to be measured • Record upper stadia lower stadia and cross hair readings. • Calculate elevation by stadia tachometry	• Examples for finding vertical distances by tachometry **Practical Activity** Determination of vertical distance by stadia tachometry		Pegs T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer	

0732B&CE-8: Perform Contouring

Objective: This module covers the knowledge and skills required to perform Contouring for the land survey i-e an imaginary line passing through points of equal reduced levels by using the level and Theodolite with its components. A contour line may also be defined “as the intersection of a level surface with the surface of the earth”. Thus, contour lines on a plan illustrates the topography of the area.

Duration: 20 Hours **Theory: 02 Hours** **Practice: 18 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Carry out Contouring (Direct Method)	**Trainee will be able to:** • Adjust level on station point (in centre of the area) • Set contour interval • Locate points of required contour levels • Measure distances from station point to the points of same levels • Draw contour lines on drawing sheet as per drawn on earth and put their levels according to given scale	• Terms relating to contouring • Characteristics and the purpose of contouring • Uses of contour map. • Method of contouring by direct method. **Practical Activity** Prepare contour map by direct method.	Theory-01 Hrs Practice-09 Hrs Total- 10 Hrs	Pencil Eraser Field Book Sharpner Ruler Pegs T- Scale Proteractor Compass Drafting Triangles T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer	Class Room, Survey Field and Drawing Hall

				Drawing Table	
LU-2. Carry out Contouring (Indirect Method)	**Trainee will be able to:** • Adjust level on station point • Divide the area into grid • Take readings of level on nodal points of grid lines • Set the contour interval • Compute points of same level by interpolation • Draw contour lines on drawing sheet as per drawn on earth and put their levels according to given scale	• Method of contouring by in-direct method. • Interpolation of contours on a plan. • Procedure to lay down alignment of road, railway and channel on contour map and procedure for measuring gradient. **Practical Activity** Prepare contour map by in-direct method.	Theory-01 Hrs Practice-09 Hrs Total- 10 Hrs	Pencil Eraser Field Book Sharpener Ruler Pegs T- Scale Protractor Compass Drafting Triangles T&E Calculator Measuring steel Tape Ranging rods Level Tripod Levelling staff Hammer Drawing Table	Class Room Survey Field and Drawing Hall

0732B&CE-9: Perform hydrographic Survey

Objective: This module covers the knowledge and skills required to perform in water with its components. It also covers the skills and knowledge required to perform Hydrographic survey for measurement and description of features which affect maritime navigation, marine construction, dredging, offshore oil exploration / offshore oil drilling and related activities.

Duration: 21 Hours **Theory: 06 Hours** **Practice: 15 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. Measure depth of a channel (by sounding rod)	**Trainee will be able to:** • Perform Reconnaissance survey • Identify equipment for Hydrographic Survey • Locate Horizontal & vertical Control • Use stationery boat • Use sounding rod • Observe bed level of channel by sounding rod	• Rule for hydrographic survey. • Hydrographic Survey. • Hydrographic Survey Instruments. • Sounding Rods • Sounding boats • Method to find out depth of channel by sounding rod • Reconnaissance survey **Practical Activity** Measure depth of a channel (by sounding rod	Theory-02 Hrs Practice-03 Hrs Total- 05 Hrs		Class Room and Survey Field
LU-2. Measure depth of a channel (by lead line)	**Trainee will be able to:** • Perform Reconnaissance survey • Identify equipment for Hydrographic Survey	• Lead Line • Method to find out depth of channel by lead line • Practical Activity • Measure depth of a channel (by lead line)	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs		Class Room and Survey Field

	• Locate Horizontal & vertical Control • Use stationery boat • Use sounding chain • Observe chain reading • Determine bed level of channel				
LU-3. Determine velocity of flowing water by current meter	**Trainee will be able to:** • Identify current meter to determine velocity of water • Assemble current meter • Use stationery boat • Place current meter at specified depth • Observe reading	• Current meter • Specifications • Operations • Method to determine velocity of water by current meter **Practical Activity** Determine velocity of flowing water by current meter	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs		Class Room and Survey Field
LU-4. Determine velocity of flowing water by float	**Trainee will be able to:** • Select area where turbulence is minimum • Mark section at least 3 times of x-section • Place float and observe time crossed by float in marked section	• Float • Method to determine velocity of water by float • Practical Activity • Determine velocity of flowing water by float	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs		Class Room and Survey Field

	• Determine velocity by float				
LU-5. Determine discharge in a channel	**Trainee will be able to:** • Compile data of depth and velocity • Calculate area of channel • Compute discharge	• Calculation of area of regular sections • Calculation of area of irregular figures • Calculation of discharge **Practical Activity** Determine discharge in a channel	Theory-01 Hrs Practice-03 Hrs Total-04Hrs		Classroom

0732B&CE-10: Compute Volume by Contouring

Objective: This module covers the knowledge and skills required to calculate Volume by a contour map, but the volume calculated by this method is approximate. It cannot be compared with the volume calculated by the cross-section method.

Duration: 14 Hours **Theory: 02 Hours** **Practice: 12 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Compute volume by contouring (By Average End Area Method)	**Trainee will be able to:** • Interpolate required contours for calculation • Find out the area between two contours • Apply Average End Area (trapezoidal) Method formula to find out volume between two contours • Sum up the volume in tabular forms for all contours	• Uses of contour map. • Interpolation contours on a plan. • Computation the capacity of reservoirs and volume of earth from the contour map. • Contour interval. • Contour for ponds and filling areas • Average area method **Practical Activity** Compute volume of given contour map by average end area (trapezoidal) method.	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Notepad Sharpner Ruler T&E Calculator	Class Room
LU2. Compute volume by contouring (By	**Trainee will be able to:** • Interpolate required contours for calculation	• Prismoidal formula • Procedure for computing the volume of reservoir capacity. **Practical Activity**	Theory-01 Hrs Practice-06 Hrs Total- 07 Hrs	Pencil Eraser Notepad Sharpner	Class Room

Prismoidal Method)	• Find out the area between two contours • Apply prismoidal formula to find out volume between two contours • Sum up the volume in tabular forms for all contours	Compute volume of given contour map by average end area (trapezoidal) method.		Ruler T&E Calculator	

9.2. Civil Engineering Drawing

0732B&CE-011. Produce Templates, Title Block / Strip & Draw Lines

Objective: This module covers the knowledge and skills required to prepare report interpreting health & safety considerations as per national standards, Select, Identify & use drawing instruments & sheets also draw lines used in drawings.

Duration: 15 Hours Theory: 3 Hours Practice: 12 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Investigate and prepare a short report on the health and safety considerations in construction of drawings.	Trainee will be able to: Observe Considerations: light (natural, artificial), CAD (C.P.U screens, electrical protection devices) Observe neatness & cleanliness of drawing	Introduction and Importance for HSE. H.S.E Consideration H.S.E Report for Auto CAD Drawing H.S.E protection devices. H.S.E. engineering communication medium. Link between drafting and H.S.E. Cleanliness of drawings. Practical Activity Prepare a short report on the health and safety considerations in construction of drawings.	Theory-0.5Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheet Duster Pencils Eraser Sand paper Sharpener Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab

Select Instruments for drawings	Trainee will be able to: Identify instruments (adjustable drawing board, tee square, set square, scale rule, compasses, drawing pens/pencils, flexible curves, French curve and templates) Select instruments in correct orientation for drawing lines - horizontal, vertical & inclined.	Introduction to drawing instruments. Identification and importance of various types of drawing instruments. Drawing medium cartridge paper, tracing paper. Uses of the various types of drawing equipment along with sizes. Adjustment of Drawing Instruments Practical Activity Select Instruments for drawings	Theory0.5Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing & Graph Sheets different sizes. Duster Pencil Eraser Pencil Sharpener Tracing Papers Sand Paper Tracing Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab
Set out a drawing sheet	Trainee will be able to: Identify drawing sheets as per British, American and ISO standards. Draw margins as per local standard. Draw title strip as per standards on imperial & half imperial size sheet.	Introduction to set out drawing sheet on board. Importance and method to set sheet on board. Different standard of drawing sheet sizes.	Theory0.5Hrs Practice-3 Hrs Total- 3.5Hrs	Drawing Sheet Duster Pencil Eraser Sharpener Machine	Drafting Lab

	Draw title block as per standards on imperial & half imperial size sheet.	Uses of the various types of drawing equipment along with sizes. Practical Activity Set out a drawing sheet of different sizes		Sand PaperT Thumb Pins Scotch Tape Tools Drawing Board Tee Square Set Square French Curves Calculator	
Draw different types of lines.	Trainee will be able to Draw lines and arrow heads used in construction drawings. Lines: basic construction line, main object outline, broken line, chain line, section line, grid line, cutting plane line, short break line, long break line. Use correct grades of pencils. Draw lines of correct weight. Draw lines with standard measurements. Observe principles of drawing lines, cleanliness.	Line definition Types and importance of lines. Arrowheads. Objectives of different lines. Weight of lines. Grades of different pencils. Components of Title Block and Title Strip. Objective of title block & title strip Method to prepare title block & title strip Practical Activity Draw different types of lines with different grades of pencils.	Theory-0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheet Duster Pencils Eraser Sharpener Sand Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab

Store prepared drawings.	Trainee will be able to Fold A0, A1, A2, A3, A4, drawing sheets as per requirements. Fold Double elephant, Imperial- full, half, quarter, antiquarian, drawing sheets as per requirements. Store the drawing sheet as per requirements	Introduction to folding of drawing sheet Importance and method to fold and unfold the drawing sheets. Method to store the drawing sheet Practical Activity Placed and re-open sheets from box.	Theory-0.5Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheet Duster Store box circular with different sizes. Zipped sheet box Rectangular	Drafting Lab

0732B&CE-012. Perform Lettering and Printing on Sheet

Objective: This module covers the knowledge and skills required to draw letters on grapgh sheet, in 4:5 & 4:7 ratio, double stroke, single stroke, upper case and lower case lettering and printing.

Duration: 24.5 Hours Theory: 3.5 Hours Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw Single Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on graph sheet.	Trainee will be able to: Observes standards for basics of drawing. Distribute space and draw both graphs on graph sheet. Draw single stroke letters as per ratio. Draw tile strip & title block for drawing sheet.	Lettering Definition. Types and uses of lettering Lettering stencils introduction and applications. Principles of lettering. Importance of Lettering Practical Activity Draw Single Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on graph sheet.	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheet Duster Pencil Eraser Sharpener Machine Sand paper Graph Papers Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab
Distribute space of half imperial drawing sheet for lettering.	Trainee will be able to: Observes standards for basics of drawing.	Space distribution of sheet. Importance of distribution Method to distribution of sheet	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheet Duster Pencil	Drafting Lab

	Use of correct grades of pencils. Provide horizontal & vertical spaces for space distribution as per required standards.	Preparation of graph. vertical division & horizontal Division of sheet Practical Activity Distribute space of half imperial drawing sheet for lettering		Eraser Sharpener Machine Sand paper Graph Papers Tools Drawing Board Tee Square Set Square French Curves Calculator	
Prepare graph for drawing 1.5” letters in ratio 4:5 and 4:7 on half imperial sheet.	Trainee will be able to: Observes standards for basics of drawing. Use of parallel lines principle for division of line into required number of segments vertically. Use of requisite set square for horizontal division. Draw graph lines.	Graph Papers introduction Importance and type Letter Hight imperial half imperial sheet horizontal division of sheet with set square method to draw graph lines Practical Activity Prepare graph for drawing 1.5” letters in ratio 4:5 and 4:7 on half imperial sheet.	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing & Graph Sheet Duster Pencil Eraser Sharpener Machine Sand paper Tools Drawing Board Tee Square	Drafting Lab

				Set Square French Curves Calculator	
Draw Single Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on half imperial drawing sheet.	Trainee will be able to Observes standards for basics of drawing. Distribute space and draw both graphs on drawing sheet. Draw single stroke letters as per ratio. Draw tile strip & title block for drawing sheet	letters stroke Importance and Type of single stroke letters Method to draw stroke Basic standards for single stroke lettering Practical Activity Draw Single Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on half imperial drawing sheet.	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Graph Sheet Duster Pencil Eraser Sharpener Sand paper Tools Drawing Board Tee Square Set Square Calculator	Drafting Lab
Draw Double Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on half imperial drawing sheet.	Trainee will be able to Observes standards for basics of drawing. Distribute space and draw both graphs on drawing sheet. Draw double stroke letters as per ratio.	letters stroke Importance and Type of Double stroke letters Method to draw stroke Basic standards for double stroke lettering lettering Practical Activity	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing & Graph Sheet Duster Pencil Eraser Sharpener Sand paper Stencil paper	Drafting Lab

	Draw tile strip & title block for drawing sheet.	Draw Double Stroke letters in ratio 4:5 and 4:7 taking 1.5" letter height on half imperial drawing sheet.		Tools Calculator Drawing Board Tee Square Set Square Card Scale	
Draw Single Stroke upper case letters 1 cm high and ¼" high in ratio 4:5 and 4:7	Observes standards for basics of drawing. Distribute space and draw both graphs on drawing sheet. Draw single stroke upper case letters as per ratio. Draw single stroke upper case free hand italic letters.	upper case letter basic drawings Importance and method to draw lettering ratio Preparation graph papers Practical Activity Draw Single Stroke upper case letters 1 cm high and ¼" high in ratio 4:5 and 4:7	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheet Duster Pencil Eraser Sharpener Sand paper Stencil paper Tools Drawing Board Tee Square Set Square Calculator	Drafting Lab
Draw Free hand Single Stroke lower case letters 1 cm high and ¼" high	Observes standards for basics of drawing. Distribute space and draw both graphs on drawing sheet.	Definition for free hand stroke lettering Importance for free hand strokes Differentiate between sketch and strokes space distribution Types of stroke free case lettering	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing & Graph Sheets Duster Pencils Eraser	Drafting Lab

printing in ratio 4:5 and 4:7	Draw single stroke lower case free hand lettering & printing as per ratio. Draw single stroke upper case free hand italic letters.	Practical Activity Draw Free hand Single Stroke lower case letters 1 cm high and ¼" high printing in ratio 4:5 and 4:7		Sharpener Sand paper Stencil Paper Clutch Pencil Tools Drawing Board Tee Square Set Square French Curves Calculator	

0732B&CE-013.Construct Scale for Drawings

Objective: This module covers the knowledge and skills required to draw reducing scales in MKS and FPS Units.

Duration: 8 Hours **Theory: 2 Hours** **Practice: 6 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Construct a plain scale of RF 1: 5& 1:20 showing metres & decimetres on half imperial drawing sheet.	Trainee will be able to: Observes local standards for basics of drawing. Distribute space in required parts. Draw scale of RF = 1:5 & 1:20 using principle of parallel lines. Draw tile strip & title block for drawing sheet.	Scales and its types Scale Factor and R.F. Importance of scale the types of scales- Reducing scales, enlarging scales, full scale. Plane scale & Its construction. Differentiate between the open-ended scale and full divided scales procedure of constructing plane scales. RF-1:5 ; Practical Activity Construct a plain scale of RF 1: 5& 1:20 showing metres & decimetres on half imperial drawing sheet.	Theory0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab
Construct a plain scale of RF 1:6 & 1: 48 showing yard,	Trainee will be able to: Observes local standards for basics of drawing.	scale, Scale Factor and R.F. RF 1:6 & 1: 48 the types of scales open-ended scale	Theory0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Drawing Sheets Duster Pencils	Drafting Lab

feet & inches on half imperial drawing sheet.	Distribute space in required parts. Draw scale of RF = 1:6 & 1:48 using principle of parallel lines. Draw tile strip & title block for drawing sheet.	Procedure of constructing plane scales. Practical Activity Construct a plain scale scale of RF 1:6 & 1: 48 showing yard, feet & inches on half imperial drawing sheet.		Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	
Construct a Diagonal scale of RF 1: 50 showing metres, decimetres & centimetres, of RF1:500 showing km, hectometres & decametres on A3 drawing sheet.	Trainee will be able to: Observes standards for basics of drawing. Distribute space in required parts. Draw scale of RF = 1:50 using principle of parallel lines and diagonals. Draw scale of RF = 1:500 using principle of parallel lines and diagonals. Draw tile strip & title block for drawing sheet.	Diagonal scale and its construction Scale Factor and R.F. Reducing scales Enlarging scales Full scale. Practical Activity Construct a Diagonal scale of RF 1: 50 showing metres, decimetres & centimetres, of RF1:500 showing km, hectometres & decametres on sheet.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square	Drafting Lab

				French Curves Calculator	
Construct a Diagonal scale of RF 1:36 showing yards, feet & inches, &of RF 1: 96 showing mile & furlong & 1/8 furlong on A3 drawing sheet.	Trainee will be able to Observes standards for basics of drawing. Distribute space in required parts. Draw scale of RF = 1:36 using principle of parallel lines and diagonals. Draw scale of RF = 1:96 using principle of parallel lines and diagonals. Draw tile strip & title block for drawing sheet.	Diagonal scale importance Scale Factor and R.F. Implementation procedure for diagonal scale. procedure of constructing diagonal scales. Practical Activity Construct a Diagonal scale of RF 1:36 showing yards, feet & inches, &of RF 1: 96 showing mile & furlong & 1/8 furlong on A3 drawing sheet.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab

0732B&CE-014. Construct Geometrical Figures

Objective: This module covers the knowledge and skills required to draw triangles, quadrilaterals, polygons- inscribed & circumscribed, draw prisms, draw pyramids, conic sections, circle, ellipse, parabola hyperbola and solid figures.

Duration: 28.5 Hours Theory: 3.5 Hours Practice: 25 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw sketches of different types of triangles according to side length and angles free hand and to scale.	Trainee will be able to: Observes standards for basics of drawing. Distribute space in required parts. Draw equilateral triangle of side length 2”. Draw isosceles triangle with base 5 cm and height = 6 cm Draw scalene triangle of lengths 2”, 1.5”, 1”. Draw acute angled triangle. Draw right angles triangle. Draw obtuse angled triangle. Draw tile strip & title block for drawing sheet	sketches Different type of triangles. Importance of sketches plane and sold figure. angles Differentiate between angles and triangles Methods to draw free hand sketches Practical Activity Draw sketches of different types of triangles according to side length and angles free hand and to scale.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab

Draw sketches of polygons, circle, semi-circle, segment of circle, sector of circle & zone of circle free hand and to a scale.	Trainee will be able to: Observe local standards for basics of drawing. Draw a regular pentagon of side length = 4 cm. Draw hexagon inscribes in a circle and circumscribed about a circle of 3 inches diameter. Draw circle, semi-circle, segment of circle, sector of circle & zone of circle of diameter 1.5 “. Draw tile strip & title block for drawing sheet	Polygon definition Type of Polygons Describe the procedure for the construction of Polygons & angles. Describe different types of triangles, quadrilaterals and polygons. Difference between inscribed and circumscribed figures. Terms used in a circle. Sketch and label different lines and arcs in a circle. Practical Activity Draw sketches of polygons, circle, semi-circle, segment of circle, sector of circle & zone of circle free hand and to a scale.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab
Draw sketches of all six types of quadrilaterals free hand to a scale	Trainee will be able to: Observes standards for basics of drawing. Distribute space in required parts. Draw square of side length 2”. Draw rectangle with length 5 cm and width= 3 cm	Quadrilaterals Definition Type of quadrilaterals Procedures to draw Parallelogram Rhombus Trapezoid shapes Practical Activity	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper	Drafting Lab

	Draw rhombus of side length=2 cm & internal angle= 45o Draw parallelogram of length 6 cm, width= 3 cm & internal angle= 45o Draw trapezoid of parallel sides' length 4 cm & 6 cm spaced at a distance of 3 cm. Draw trapezium of side lengths 5 cm, 4 cm, 6 cm & 3 cm. Draw tile strip & title block for drawing sheet	Draw sketches of all six types of quadrilaterals free hand to a scale		Tools Drawing Board Tee Square Set Square French Curves	
Draw conic sections with cutting plane at different angles	Trainee will be able to Draw conic section resulting in a circle. Draw conic section resulting in an ellipse. Draw conic section resulting in a parabola. Draw conic section resulting in a hyperbola.	Cone and conical sections, Parabola Procedure to draw Importance of conic section Angles and its types Practical Activity Draw conic sections with cutting plane at different angles	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Graph Sheets Duster Pencils Eraser Sharpener Sand paper Stencil Paper Tools Drawing Board Tee Square Set Square	Drafting Lab

				French Curves	
Draw full scale ellipses major axis = 10 cm and minor axis = 8 cm with four methods.	Trainee will be able to Draw ellipse by four centers method. Draw ellipse by basic method. Draw ellipse by parallelogram method. Draw ellipse by off-set method in concentric circles.	Ellipse Definition Importance of Ellipse Types of ellipse Procedure to draw ellipse by all methods Practical Activity Draw full scale ellipses having different major and minor axis with all methods.	Theory0.5 Hrs Practice-4Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Scotch Tape Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab
Draw full scale parabola major axis = 10 cm and minor axis = 8 cm with four methods.	Trainee will be able to Draw parabola by basic method. Draw parabola by tangent method. Draw parabola by rectangle method	Definition of parabola Method to draw parabola Types of parabola Importance to draw parabola Practical Activity	Theory0.5 Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper	Drafting Lab

		Draw full scale parabola having different major and minor axis with four methods.		Graph Papers Stencil Paper Scotch Tape Tools Drawing Board Tee Square Set Square French Curves	
Draw sketched of prisms, cylinders, pyramids, cones in isometric views free hand and to a scale.	Trainee will be able to Draw right & oblique rectangular prism. Draw right and oblique cylinders. Draw right & oblique hexagonal pyramids. Draw right & oblique cones.	Prisms and its types Procedure to draw prisms. Cone and its types Isometric view & its type Pyramids and its types Cylinder and its types Practical Activity Draw sketched of prisms, cylinders, pyramids, cones in isometric views free hand and to a scale.	Theory1.5 Hrs Practice-5 Hrs Total- 6.5 Hrs	Drawing Graph Sheets Duster Pencils Eraser Sharpener Sand paper Stencil Paper Scotch Tape Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab

0732B&CE-015. Produce Orthographic Projection

Objective: This module covers the knowledge and skills required to draw orthographic projections, First angle projections, third angle projections of vee block, hollow concrete block, wooden cut blocks and draw missing view.

Duration: 10 Hours Theory: 2 Hours Practice: 8 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw orthographic projections of Vee Block in first angle projection system.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views by use of projector and drawing instruments.	Orthographic projections Principle of orthographic projection with simple sketches. Different projection system Differentiate between 1st & 3rd angle of projection Identify of the orthographic views of the object. Practical Activity Draw orthographic projections of Vee Block in first angle projection system.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Scotch Tape Tools Drawing Board Tee Square	Drafting Lab

				Set Square French Curves	
Draw orthographic projections of hollow concrete Block in first angle projection system.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views by use of projector and drawing instruments.	Orthographic projections with its type Principle of orthographic projection with simple sketches. Projection system Differentiate between 1st & 3rd angle of projection Practical Activity Draw orthographic projections of hollow concrete Block in first angle projection system.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Scotch Tape Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab
Draw orthographic projections of wooden cut block in	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations.	plane and principal plane. principle of orthographic projection with simple sketches. different views of Projection	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser	Drafting Lab

first angle projection system.	Draw front, top and side views by use of projector and drawing instruments.	1st angle projection 3rd angle projection Use of projections Selection of projections Practical Activity Draw orthographic projections of wooden cut block in first angle projection system.		Sharpener Sand paper Graph Papers Stencil Paper Scotch Tape Tools Drawing Board Tee Square Set Square French Curves Calculator	
Complete missing views when two views are given.	Trainee will be able to Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views by use of projector and drawing instruments.	Views definition Dihedral and trihedral angles. the types of orthographic projection. Sketch the orthographic views Samples part of given views / drawing. Practical Activity Draw orthographic projections of wooden cut block in 3rdf angle projection system.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square	Drafting Lab

				French Curves Calculator	

0732B&CE-016. Perform Sectioning

Objective: This module covers the knowledge and skills required to to draw full sectional views & offset sectional views of hollow concrete block, hollow hexagonal prism nad rectangular pyramid.

Duration: 7 Hours Theory: 2 Hours Practice: 5 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw full sectional front view and outside top view of the hollow concrete block.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of hollow concrete block. Draw materials symbols -Hatch the section portion in views.	top view front view side view material symbols method to calculate the space of drawing sheet Practical Activity Draw full sectional front view and outside top view of the hollow concrete block.	Theory0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Drawing & Graph Sheets Duster Pencils Eraser Sharpener Sand paper Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab
Draw full sectional front view, side view and top view of the	Trainee will be able to:	Definition for section and sectioning. purpose of sectional views. cutting plane and cutting plane line.	Theory0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Drawing Sheets Duster Pencils	Drafting Lab

prisms, pyramids of different types.	Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of hollow hexagonal prism. Draw front, top and side views of rectangular pyramid. Hatch the section portion in views.	Purpose of cutting plane line. conventional representation of engineering materials. Hatching and its types Process of hatching Practical Activity Draw full sectional front view, side view and top view of the prisms, pyramids of different types.		Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	
Draw offset sectional front view and outside top view of the hollow concrete block.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of hollow concrete block. Hatch the section portion in views.	Know rule of putting arrowhead on cutting plane line. types of sectional views. Principles of hatching. Frontal view Practical Activity Draw offset sectional front view and outside top view of the hollow concrete block.	Theory0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Drawing Sheets Duster Pencils Eraser Sand paper Graph Papers Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab

Draw offset sectional front view, side view and top view of the prisms, pyramids of different types.	Trainee will be able to Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of hollow hexagonal prism. Draw front, top and side views of rectangular pyramid. Hatch the section portion in views.	Purpose of sectional views. Cutting plane line and its method. Importance of cutting plane line. conventional representation of line hatching of engineering materials. Practical Activity Draw offset sectional front view, side view and top view of the prisms, pyramids of different types.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Calculator Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab

0732B&CE-017. Perform Dimensioning on Drawings

Objective: This module covers the knowledge and skills required to dimension a drawing by adopting Uni-directional and bi-directional dimensioning, Base line dimensioning system, continuous dimensioning system, location dimensioning.

Duration: 5 Hours Theory: 1 Hours Practice: 4 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Prepare a Dimensioned drawing by adopting Uni-directional and bi-directional dimensioning.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of Vee block. Dimension the drawing Uni-directionally. Dimension the drawing bi-directionally.	Base line dimensioning Dimension types System of dimensioning. Uni & bi-directional dimensioning. 1Base line dimensioning system. continuous dimensioning system location dimensioning. Practical Activity Prepare a Dimensioned drawing by adopting Uni-directional and bi-directional dimensioning.	Theory-0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square	Drafting Lab

				French Curves	
Prepare a Dimensioned drawing by adopting Base line dimensioning system, continuous dimensioning system, location dimensioning.	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Distribute space by calculations. Draw front, top and side views of Vee block with holes. Dimension the drawing as per base line dimensioning system. Dimension the drawing as per continuous dimensioning system. Dimension the drawing location of center of holes Draw system of dimensioning Draw dimensioning of holes Draw dimensioning of arc Draw dimensioning circles Draw dimensioning of angles	Dimensioning. Need of dimensioning drawings according to accepted standards Dimension and extension line, arrow head, dimension, leader. Types of arrow head, length of arrowhead. Draw dimension for location and size of holes, arcs, circles. Dimension a given drawing using standard notations and desired system of dimensioning. Practical Activity Prepare a Dimensioned drawing by adopting Base line dimensioning system, continuous dimensioning system, location dimensioning.	Theory-0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab

				Templates	

0732B&CE-018. Produce Pictorial Drawings

Objective: This module covers the knowledge and skills required to to draw isometric views, oblique views, and perspective views of objects. Draw isometric, oblique and perspective views from principal views.

Duration: 16.5 Hours Theory: 2.5 Hours Practice: 14 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw isometric views of a cube having circular hole in its focus and R.C.C. stairs (First three steps).	Trainee will be able to: Apply basic operations on A3 size sheet and divide space. Select base line Draw isometric view observing OHSE requirements. Draw holes (ellipses in three isometric planes.)	Isometric views basic operations for Isometric views OHSE Isometric axis, angles, scales. Arcs and circles. Isometric and non-isometric lines. Sketch isometric drawing and isometric projection Practical Activity Draw isometric views of a cube having circular hole in its focus and R.C.C. stairs.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square	Drafting Lab

				French Curves Calculator Templates	
Draw isometric views of R.C.C. stairs-First three steps.	Trainee will be able to: Select base line. Draw isometric view observing OHSE requirements. Perform lettering & Dimensioning.	pictorial drawing. base line the types of isometric views. uses of isometric views Sketch the isometric projection from the given orthographic drawings. lettering Practical Activity Draw isometric views of R.C.C. stairs-First three steps.	Theory0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab

Create an oblique drawing of different prisms and pyramids from its given principal views.	Trainee will be able to: Select base line. Draw oblique view with the help of given principal views. Perform lettering & Dimensioning.	Oblique views, Importance and types pyramids Principal views. dimensioning The angle of receding axis. The oblique drawing and its uses. Practical Activity Create an oblique drawing of different prisms and pyramids from its given principal views.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Calculator	Drafting Lab
Draw Perspective drawing of slotted block and different wooden blocks	Trainee will be able to Select base line. Draw the principal views. Select the vanishing points, mirror line	Sketch and letter the oblique cavalier and cabinet views. Perspective drawing. Purpose importance and types of perspective drawing.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser	Drafting Lab

from there given principal views.	Draw Perspective view. Perform lettering & Dimensioning.	Vanishing point. Principles of perspective views. Parallel and angular (diametric and trimetric) perspective Practical Activity Draw Perspective drawing of slotted block and different wooden blocks from there given principal views.		Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Templates Calculator	
Draw Isometric view with the help of orthographic projections of hollow concrete block	Trainee will be able to Select base line. Draw isometric view with the help of given principal views. Perform lettering & Dimensioning.	Isometric views orthographic projections principal of isometric views Differentiate between dimensioning & lettering Importance of orthographic projections Practical Activity Draw Isometric view with the help of orthographic projections for different blocks.	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing & graph Sheets Duster Pencils Eraser Sharpener Tools Drawing Board Tee Square	Drafting Lab

				Set Square French Curves	

0732B&CE-019. Develop Symbols of Engineering Drawings

Objective: This module covers the knowledge and skills required to to prepare report on the health and safety considerations while preparing drawings, draw symbols of Engineering materials, components of building in plan, elevation & section, draw symbols of electrical installations, water supply installation, gas installations, sanitary installations.

Duration: 12 Hours Theory: 3 Hours Practice: 9 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Investigate and prepare a short report on the health and safety considerations in preparing drawings.	Trainee will be able to: Observe Considerations: light (natural, artificial), CAD (C.P.U screens, electrical protection devices) Observe neatness & cleanliness of drawing	report for health and safety to prepare a drawing electrical protection devices Differentiate natural and artificial light Practical Activity Act safety preparation to draw a drawing on sheet	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper	Drafting Lab

Draw symbols of engineering materials.	Trainee will be able to: Select the suitable instruments to draw symbols. Distribute space of drawing sheet. Draw symbols duly hatched as per local standards of- Sand, ballasts, metals, timbers, soil-natural, cutting, filling, fabrics, rock, glass, ceramics, plastics, asbestos.	Drawing instruments material symbols distribution of drawing sheet. Practical Activity Draw different symbols of Engineering Materials used in Construction Projects.	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing Graph Sheet Duster Pencils Eraser Sharpener Sand paper Tools Drawing Board Tee Square Set Square French Curves Scales Card, Compass	Drafting Lab
Draw symbols of building components in plan, section, & section.	Trainee will be able to: Select the suitable instruments to draw symbols. Distribute space of drawing sheet. Draw symbols in plan, section, & section duly hatched as per local standards of- brick work, stone work, block work, doors, windows,	conventional symbols and give its importance. Enlist different symbols and sketches of Engineering materials- Sand, ballasts, metals, timbers, soil-natural, cutting, filling, fabrics, rock, glass, ceramics, plastics, asbestos. RCC, RB Work, Lintel, Stairs, DPC and PCC Practical Activity	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing Graph Sheet Duster Pencils Eraser Sharpener Sand paper Calculator Tools	Drafting Lab

	ventilators, RCC work, R.B. work, PCC, DPC, Lintels, stairs	Draw different symbols of building components its plan, section and elevation.		Drawing Board Tee Square Set Square French Curves Scales Card, Compass Divider Protractor	
Draw symbols of electrical installations for ceiling and walls.	Trainee will be able to Select the suitable instruments to draw symbols. Distribute space of drawing sheet. Draw symbols duly hatched as per local standards of- energy meter, main switches, sub-main switches, circuit breakers, kit kat, panel box, DFB, tube lights, holders, fans, bulbs, switches, socket, boards, circuit diagram	Enlist and sketch symbols of electrical installations- energy meter, main switches, sub-main switches, circuit breakers, kit kat, panel box, DFB, tube lights, holders, fans, bulbs, switches, socket and boards along with circuit diagrams. Practical Activity Draw different symbols of Electrical Installation.	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing, Graph Sheet Duster Pencils Eraser Sharpener Sand paper Tools Drawing Board Tee Square Set Square French Curves Scales Card, Compass Protractor	Drafting Lab

Draw symbols of water supply and gas installations.	Trainee will be able to Select the suitable instruments to draw symbols. Distribute space of drawing sheet. Draw symbols duly hatched as per local standards of- water pipe lines, mixers, valves, cocks, taps, showers, pump, meter, cooler. Gas pipe line, Gas meter, gas heater, gas light, gas geezer, gas burner.	Enlist and sketch water supply installation, gas installations- water pipe lines, mixers, valves, cocks, taps, showers, pump, meter, cooler. Gas pipe line, Gas meter, gas heater, gas light, gas geezer, gas burner. Practical Activity Draw different symbols of Gas Installation and water supply.	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing, Graph Sheet Duster Pencils Eraser Sharpener Sand paper Calculator Tools Drawing Board Tee Square Set Square French Curves Scales Card, Compass	Drafting Lab
Draw symbols of sanitary installations.	Trainee will be able to Select the suitable instruments to draw symbols. Distribute space of drawing sheet. Draw symbols duly hatched as per local standards of- sewer lines, wash hand basins, water closets, bath tubs, urinals, sinks, dish	Enlist and sketch sanitary installations- sewer lines, wash hand basins, water closets, bath tubs, urinals, sinks, dish washers, looking mirror, toilet paper holder, soap dish, shelf, towel rail, vent pipe, manhole, intercepting chambers, traps, grating. space distribution for drawing sheet different instruments to draw symbols	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers	Drafting Lab

	washers, looking mirror, toilet paper holder, soap dish, shelf, towel rail, vent pipe, manhole, intercepting chambers, traps, and grating.	Differentiate between Indian and European W.C Differentiate between lamp hole and manhole Practical Activity Draw different symbols of Sanitary Installation. (Free hand sketches and by scale drawings)		Calculator Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor	

0732B&CE-020. Produce Cross Section of Wall

Objective: This module covers the knowledge and skills required to draw 2 dimensional & 3 dimensional cross section of wall along with flooring, roofing & finishing detail.

Duration: 18 Hours Theory: 2.5 Hours Practice: 15.5 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Draw Cross section of 9” thick wall, 13.5” Thick wall.	Trainee will be able to: Observes standards for basics of drawing. Distribute space and draw both graphs on graph sheet. Draw parts of wall- foundation concrete, brick work, GL. FL., DPC, Super structure, plastering, lintel, sunshade, doors, windows, ventilator, almirah. Label parts.	Cross Section basis of Cross Section for Wall 9” basis of Cross Section for Wall 13.5” parts of wall Draw x-section of wall and show its components plastering Differentiate between lintel and beam super structure Practical Activity Draw Cross section of 9” thick wall, 13.5” Thick wall.	Theory0.5Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Card Scales Tools Drawing Board Tee Square Set Square French Curves Card Scales Compass	Drafting Lab

				Protractor	
Draw Cross section of 20 cm thick wall, 30 cm Thick wall.	Trainee will be able to: Observes standards for basics of drawing. Distribute space of sheet. Draw parts of wall- foundation concrete, brick work, GL. FL., DPC, Super structure, plastering, lintel, sunshade, doors, windows, ventilator, almirah. Label parts.	Cross Section basis of Cross Section for Wall 9” basis of Cross Section for Wall 13.5” parts of wall Draw x-section of wall and show its components plastering Differentiate between C. Window and window Practical Activity Draw Cross section of 20 cm thick wall and 30 cm Thick wall.	Theory0.5Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Calculator Tools Drawing Board Tee Square Set Square French Curves Scales Card, Compass Protractor	Drafting Lab

Draw parts of flooring	Trainee will be able to: Observes standards for basics of drawing. Draw parts of flooring- earth filling, sand filling, base concrete, topping floor. Label parts.	Enlist parts of flooring- earth filling, sand filling, base concrete, topping floor. Sketch parts of flooring- earth filling, sand filling, base concrete, topping floor. Differentiate between sand filling and earth filling topping base concrete Practical Activity Draw Cross section of concrete, terrazzo and tile floors.	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor	Drafting Lab
Draw parts of Roofing.	Trainee will be able to Observes standards for basics of drawing.	Enlist parts of Roofing. Sketch parts of roofing.	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster	Drafting Lab

	Parts of roofing- roof slab, slab projection, parapet, drip course, cornice, bitumen coating, polythene sheet, earth filling over plaster, tile flooring. Label parts.	Differentiate between parapet and slab projection topping bitumen coating tile flooring laying method of polythene sheet on roof Practical Activity Draw Cross section of mud, wooden, RCC and RB Roofing.		Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales Card, Compass Protector	
Draw cross section of 13.5” thick wall in isometric view.	Trainee will be able to Draw substructure of 13.5” thick walls. Draw super structure components of wall. Draw roofing components along with parapet- roof slab, slab projection, parapet, drip course, cornice,	Enlist parts of sub-structure sub-structure Sketch parts of roofing- roof slab, slab projection, parapet, drip course, cornice, bitumen coating, polythene sheet, earth filling over plaster, tile flooring. floor topping sun shade	Theory0.5Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper	Drafting Lab

	bitumen coating, polythene sheet, earth filling over plaster, tile flooring. Draw flooring components- earth filling, sand, base concrete and topping floor. Draw window, lintel and sunshade.	Practical Activity Draw Cross section of 9” and 13.5” wall in isometric view.		Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	

0732B&CE-021. Develop Building Drawings

Objective: This module covers the knowledge and skills required to read, draw plans, elevations, sections, schedules of single room, two roomed quarter, c-type building and submission drawing.

Duration: 21.5 Hours **Theory: 2.5 Hours** **Practice: 19 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Prepare report on various features after reading the drawing of an existing building.	Trainee will be able to: Observe feature like rooms and sizes. Observe inter-relation of rooms. Observe openings in building. Observe building services.	report for features of building. features of living room opening for building building services Describe the elements of report on residential building. Practical Activity Prepare report on various features after reading the drawing of an existing building.	Theory-0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Card Scales Compass Protractor	Drafting Lab

				Stencils	
Prepare drawings for single room 14’ x 12’ having wall thickness 9”.	Trainee will be able to: Observes local standards for basics of drawing. Distribute space in required parts. Draw line plan of room as per given data. Draw detailed plan of room. Draw Elevation of single room. Draw Section of room passing through opening. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	local standards method to distribute sheet. line plan detail plan Differentiate between elevation and plan cross section title strip title Block Practical Activity Draw plan and cross section for single room 14’ x 12’ having wall thickness 9”.	Theory-0.5 Hrs Practice-4.5 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	Drafting Lab

Prepare drawings for two roomed quarter along with bath, kitchen, verandah, courtyard.	Trainee will be able to: Observes local standards for basics of drawing. Distribute space in required parts. Draw line plan of two roomed quarter as per given data. Draw detailed plan of two roomed quarter. Draw Elevation of two roomed quarter. Draw Section of two roomed quarter passing through opening. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	the different types of building drawings. Describe the different rooms in residential and educational building of different classes. Describe the different rooms in hospital and industrial building of different classes. detail plan Differentiate between lettering & dimensioning Practical Activity Prepare drawings for two roomed quarter along with bath, kitchen, verandah, courtyard.	Theory-0.5 Hrs Practice-4.5 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales cards Compass Protractor Stencils	Drafting Lab
Prepare drawings for C-type residence.	Trainee will be able to Observes local standards for basics of drawing. Distribute space in required parts. Draw line plan of C-type residence as per given data.	Describe the different rooms in public & commercial building of different classes. the sizes of rooms for different classes of residences and other buildings. measurements from a given plan. dimensioning method	Theory-0.5 Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper	Drafting Lab

	Draw detailed plan of C-type residence. Draw Elevation of C-type residence. Draw Section of C-type residence passing through opening. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	c-type building Practical Activity Prepare drawings for C-type residence.		Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	
Prepare Submission drawing for a double storey residence of plot size 50'x78'.	Trainee will be able to Observes local standards for basics of drawing. Distribute space in required parts. Draw detailed plans of double storey residence as per given data. Draw foundation plan of double storey residence. Draw front, side & rear elevations of double storey residence.	site plan, line plan, detailed plan, layout plan, index plan, elevations & sections. Sketch plans, elevations, and sections of buildings from given line diagrams. Label the parts of given plan. the procedure for preparing plans, elevations and sections for single storey and double storey buildings. Prepare schedule of openings in building.	Theory-0.5 Hrs Practice-5 Hrs Total- 5.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board	Drafting Lab

	Draw two sections of double storey residence passing through opening. Draw site plan, landscape plan of double storey residence. Perform dimensioning, lettering & printing of drawings. Prepare schedule of area, openings, iron fittings. Draw title strip for drawing sheet.	Prepare schedule of area, and iron fittings for doors, windows, almirah etc. Practical Activity Prepare Submission drawing for a double storey residence of plot size 50'x78'.		Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	

0732B&CE-22. Perform House Planning

Objective: This module covers the knowledge and skills required to prepare report on orientation & ventilation of an existing building and plan & prepare drawing of c-type residence as per local regulations.

Duration: 6.5 Hours Theory: 1 Hours Practice: 5.5 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Prepare report on orientation & ventilation of an existing building.	Trainee will be able to: Observe orientation of rooms. Compare opening sizes as per local regulations. Draft the report on ventilation.	orientation opening for buildings local regulations. Oriwentation ventilation method of ventilation	Theory-0.5Hrs Practice1.5Hrs Total-2 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers	Drafting Lab

		building bye laws of different national agencies Practical Activity Prepare report on orientation & ventilation of an existing building.		Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Card Scales Compass Protractor Stencils	
Plan & prepare drawing of c-type residence as per local regulations for ventilation and seismic auspects.	Trainee will be able to: Observes local standards for basics of drawing. Distribute space in required parts. Calculate area of floors, volume of rooms as per ventilation & seismic aspects. Draw detailed plan of residence as per regulations. Draw Elevation of residence. Draw Section of room passing through opening. Prepare schedule of area, openings.	House planning the necessity of house planning the factors, which govern the selection of site for building orientation and ventilation. the factors affecting the planning of a house. Perform area of plot. the inter-relationship of different rooms the minimum area of the building openings for ventilation. Describe the positions of openings in building	Theory0.5 Hrs Practice-3 Hrs Total- 3.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves	Drafting Lab

	Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	Practical Activity Draw c-type residence as per local regulations for ventilation and seismic auspects.		Scales (Card, Plane & Diagonal) Compass Protractor Stencils	

0732B&CE-023. Produce Layout Plans for Building Services.

Objective: This module covers the knowledge and skills required to produce detailed plan for water supply, gas, sanitary, electricity installations in residence & circuit diagram.

Duration: 12 Hours Theory: 2 Hours Practice: 10 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Prepare detailed plan of water supply & sanitary installations for A class bath on A4 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts. Draw detailed plan of A class bath. Draw water supply installations. Draw sanitary installations. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	building services. Enlist water supply, gas, sanitary & electricity installations for residential building. Discuss space distribution for drawing sheet. title strip lettering method of dimensioning A4 Sheet Practical Activity Prepare detailed plan of water supply & sanitary installations for A class bath on A4 sheet	Theory-0.5Hrs Practice2.5Hrs Total- 3 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Card Scales Compass Protractor Stencils	Drafting Lab

Prepare detailed plan of water supply, gas & sanitary installations for A class kitchen on A4 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts. Draw detailed plan of A class kitchen. Draw water supply installations. Draw gas installations. Draw sanitary installations. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	Prepare schedule of different fixtures required for bath, kitchen, dining and courtyards. Sketch the different fixtures in kitchen and bathrooms at their proper places. sheet Nos. Practical Activity Prepare detailed plan of water supply, gas & sanitary installations for A class kitchen on A4 sheet.	Theory-0.5Hrs Practice2.5Hrs Total- 3 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	Drafting Lab

Prepare detailed plan of water supply gas & sanitary installations for C type residence on A3 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts. Draw detailed plan of C type residence. Draw water supply installations. Draw gas installations. Draw sanitary installations. Prepare schedule of installations. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	Sketch the building services in C class residence at their proper places. water supply installation Gas installation Sanitary installation Differentiate between lettering and dimensioning. Differentiate between title strip and title block. Practical Activity Prepare detailed plan of water supply gas & sanitary installations for C type residence on A3 sheet.	Theory-0.5Hrs Practice2.5Hrs Total- 3 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	Drafting Lab
Prepare detailed plan of electrical installations & Circuit diagram for C type	Trainee will be able to Observe local standards for basics of drawing. Distribute space in required parts.	local standards for residential building c-type building electrical installation circuit diagram	Theory-0.5Hrs Practice2.5Hrs Total- 3 Hrs	Drawing Graph Sheets Duster Pencils	Drafting Lab

residence on A3 sheet.	Draw detailed plan of C type residence. Draw electrical installations. Draw Circuit diagram Prepare schedule of installations. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	schedule for installation Practical Activity Prepare detailed plan of electrical installations & Circuit diagram for C type residence on A3 sheet.		Eraser Sharpener Sand paper Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales Cards Compass Protractor Stencils	

0732B&CE-024. Produce Drawings of Sanitary Structures

Objective: This module covers the knowledge and skills required to produce drawings of soakage pit, soak pit, septic tank, manhole and sewer line.

Duration: 18 Hours Theory: 2 Hours Practice: 16 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Prepare drawing of Soakage & Soak Pit for 25 users on A3 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts. Draw plan & section of soakage pit. Draw plan & section of soak pit. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	sanitary structures. Enlist sanitary structures- soakage pit, soak pit, septic tank, manhole and sewer line. Sketch & label sanitary structures- soakage pit, soak pit, septic tank, manhole & sewer line. Differentiate between man hole and lamp hole Practical Activity Prepare drawing of Soakage & Soak Pit for 25 users on A3 sheet.	Theory0.5Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales Card Compass Protractor Stencils	Drafting Lab

Prepare drawing of rectangular Septic Tank for 25 users on A3 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts. Draw plan & sections of Septic Tank. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	the purpose of sanitary structures. septic tank soakage pit local standards for soakage pit design local standards for soakage pit design Differentiate between title strip and title block Practical Activity Prepare drawing of rectangular Septic Tank for 25 users on A3 sheet.	Theory0.5Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales Card Compass Protractor	Drafting Lab
Prepare drawing of rectangular Manhole on A3 sheet.	Trainee will be able to: Observe local standards for basics of drawing. Distribute space in required parts.	man hole type of man hole shaft for man hole deep man hole drawing sheet distribution	Theory0.5Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing Sheets Duster Pencils Eraser Sharpener	Drafting Lab

	Draw plan, long section & cross section of manhole. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	Differentiate between long section and cross section Practical Activity Prepare drawing of rectangular Manhole on drawing sheet.		Sand paper Graph Papers Stencil Paper Tools Drawing Board Tee Square Set Square French Curves Scales (Card, Plane & Diagonal) Compass Protractor Stencils	
Prepare drawing of Sewer line on A4 sheet.	Trainee will be able to Observe local standards for basics of drawing. Draw cross section of sewer line. Perform dimensioning, lettering & printing of drawings. Draw title strip for drawing sheet.	Sewer Line sewage sewer joints type of sewer joints Differentiate between sewer and drain gradient Practical Activity Prepare drawing of Sewer line its joints on drawing sheet.	Theory0.5Hrs Practice-4 Hrs Total- 4.5 Hrs	Drawing, Graph Sheets Duster Pencils Eraser Sharpener Tools Drawing Board Tee Square	Drafting Lab

				Set Square French Curves Card Scales Compass	

9.3. Building Materials

0732B&CE-025. Identify bricks

Objective: This module covers the knowledge and skills required to interpret brick is a man-made building material used to make walls and make places to walk. It is a single unit of a kneaded clay-bearing soil, sand and lime, or concrete material, fire-hardened or air-dried, used in masonry construction. Bricks are made mostly of clay. Bricks used outdoors on the ground are called "pavers"

Duration: 10 Hours **Theory: 4 Hours** **Practice: 6 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Inspect Brick Kiln	**Trainee will be able to:** • Identify constituents' materials i.e.: clay, water, admixtures • Ensure mixing proportions i.e: hand mixing and machine mixing • Inspect brick making method • Prepare Report	• Uses of different building materials in construction. • Explanation of different building materials. • Method to prepare brick kiln. **Practical activity**: Inspect brick kiln.	Theory-0.5 Hrs Practical-0.5 Hrs Total- 1 Hrs	Pencil Eraser Notebook	Class Room and brick kiln
LU2. Inspect Pre-Cast block unit factory	**Trainee will be able to:** • Identify manufacturing items • Identify constituents' materials • Ensure mixing proportions	• Pre-cast block. • Method to prepare pre-cast block. • Different uses of pre-cast block. **Practical activity**:	Theory-0.5 Hrs Practical-0.5Hrs Total- 1 Hrs	Pencil Eraser Notebook	Class Room and pre-cast unit factory

	• Record making process	Inspect pre-cast block unit factory.			
LU3. Inspect a quarry / crusher	**Trainee must be able to:** • Inspect raw material. • Separate aggregate types e.g: fine aggregate and coarse aggregate • Record the crushing procedure. • Prepare Report	• Essential need for aggregate • definition of quarry and its working • definition of quarrying its type • procedure of blasting method **Practical activity**: Inspect quarry.	Theory-0.5 Hrs Practical-0.5 Hrs Total- 1 Hrs	Pencil Eraser Notebook	Class Room and quarry
LU4. Inrerpret brick manufacturing process	**Trainee must be able to** • Identify raw materials • Mixed raw material • Check ingredients. • Clean & filled mould • Empty mould • Dry bricks • Cook bricks in kiln • Use PPEs	• Explanation of demand of water for different building materials • Definition of admixture and its examples • Description optimizing quality of crush • Explanation of network for different building materials • Description of safety precautions for laying, preparing brick & aggregate • Procedure of manufacturing of bricks **Practical activity**: Prepare brick in lab	Theory-1 Hrs Practical-1.5 Hrs Total- 2.5 Hrs	Mixing machine Brick mould Spirit level Thermometer PPEs	Class Room and brick kiln
LU5. Test bricks	**Trainee must be able to** • Select bricks • Find compressive strength of selected bricks	• Explanation of variation in size of bricks • Compressive strength of brick. • Definition of water absorption. • Definition of effloresce of brick and types.	Theory-1.5 Hrs Practical-3Hrs Total- 4.5 Hrs	Compression machine Water tank	Class Room and lab

	• Find water absorption of selected bricks • Check ingredients. • Check dimensional tolerance of selected bricks • Find efflorescence of selected bricks • Perform hardness test on selected bricks • Perform abrasion test on selected bricks • Check structure of selected bricks	• Definition of hardness of brick. • Definition of abrasion resistance. • Description of physical properties of brick. **Practical activity**: Perform compression test, water absorption test, dimensional tolerance test, efflorescence test, abrasion test and hardness test on brick in lab.		Abrasion testing drum Measuring scale Brick cutter	

0732B&CE-026. Dress stone for masonry

Objective: This module covers the knowledge and skills required to perform roughly dressed stones are laid in a mortar the result is a stone rubble masonry and Ashlar Masonry. Stone masonry using dressed (cut) stones is known as ashlar masonry. Stone Veneer. Stone veneer is used as a protective and decorative covering for interior or exterior walls and surfaces.

Duration: 10 Hours **Theory: 4 Hours** **Practice: 6 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Inspect dressing of natural stone	• **Trainee will be able to:** • Identify materials i.e.: different types of stones • Observe dressing process i.e.: ashlar and rough • Record the process	• Purpose and application of stone masonry. • Different type of stones used in masonry • Types of stone dressing **Practical activity**: Observe dressing of stones.	Theory-1 Hrs Practical-2 Hrs Total- 3 Hrs	PPEs Hammer Chisels Thermometer	Class Room and lab
LU2. Interpret Stone masonry (Rubble)	**Trainee will be able to:** • Identify Materials • Pick Rough stones • Prepare cement sand mortar • Perform alignment with spirit level • Lay stones in layers • Carry out Joints filling with mortar • Perform safety precautions	• Knowledge for method to apply rough stone masonry • Description of working of stone masonry precautions. • different jointing methods of stones • Safety procedure for joining of rubble stone stones i.e.: use gloves, boots, helmet, apron and mask • Procedure of filling holes method in rough stone masonry	Theory-1.5 Hrs Practical-2 Hrs Total- 3.5 Hrs	trowel Spirit level PPEs Hammer Chisels Calculator Thermometer Stone masonry instruments	Class Room and lab

		Practical activity: Perform rubble stone masonry in lab.			
LU3. Interpret Stone masonry (Ashlar)	**Trainee must be able to:** • Identify Materials • Sharpen edge of Rough stones • Prepare cement sand mortar • Perform alignment • Lay stones in layers • Carry out Joints filling with mortar • Perform safety precautions	• Method to apply ashlar stone masonry • Different methods of jointing of ashlar stone masonry. **Practical activity**: Perform ashlar stone masonry in lab.	Theory-1.5 Hrs Practical-2 Hrs Total- 3.5 Hrs	trowel Spirit level PPEs Hammer Chisels Calculator Thermometer Stone masonry instruments	Class Room and lab

0732B&CE-027. Prepare slaked lime

Objective: This module covers the knowledge and skills required to apply white alkaline substance consisting of calcium hydroxide, made by adding water to quicklime and used in traditional building methods to make plaster, mortar, and lime wash it Quicklime reacts with water to form slaked lime (**calcium hydroxide**). Slaked lime is used to reduce the acidity of lakes and soils. Lakes and soils can become acidic because of acid rain.

Duration: 4 Hours **Theory:2 Hours** **Practice:2 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare slacked lime	**Trainee will be able to:** • Identify requisite material • Spread lime at ponds • Add water • Administer change in lime • Check strength	• Definition of lime. • Properties of lime. • Method to convert quick lime into slaked lime. • Procedure to get lime from quarry. • Design procedure for maintaining a quarry • Safety precaution to get lime from quarry • Explanation of PPEs **Practical activity**: Prepare slaked lime in lab.	Theory-1 Hrs Practical-1 Hrs Total- 2 Hrs	PPEs Thermometer Water bucket	Class Room and lab
LU2. Store quick lime	**Trainee will be able to:** • Classify lime as per use • Identify go down for storing lime • Prepare lime putty to store lime	• Safety procedure i.e.: use gloves, boots, helmet, apron and mask **Practical activity**: Store lime using precautions.	Theory-1 Hrs Practical-1 Hrs Total- 2 Hrs	PPEs Thermometer Shovel Lime bed	Class Room and lab

0732B&CE-028. Identify and store cement for construction

Objective: This module covers the knowledge and skills required for basics as construction material powdery substance made by calcining lime and clay, mixed with water to form mortar or mixed with sand, gravel, and water to make concrete. **Store cement** in a building which is dry, leak proof and as moisture proof as possible. There **should** be minimum number of windows in the storage building. Stack the **cement** bags off the floor on wooden planks in such a way, so that it is about 150 mm to 200 mm above the floor.

Duration: 10 Hours **Theory: 4 Hours** **Practice: 6 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Develop Flow diagram for manufacturing of cement	**Trainee will be able to:** • Identify drawing instruments • Fix Drawing sheet on board Select scale • Use safety precautions for drawing • Draw flow diagram	• Manufacturing of cement • Parts of cement manufacturing plant • Working of rotary kiln. • Temperature zone at rotary kiln. • **Practical activity**: Prepare flow diagram of manufacturing of cement in class room.	Theory-2 Hrs Practical-3 Hrs Total- 5 Hrs	Pencil, Eraser, Sharpner Calculatr Measuring scale Drawing sheet Measuring Tape, Compass,	Class Room
LU2. Manage storage process for cement	**Trainee will be able to:** • Identify material • Locate moisture proof place • Stack cement bags • Cover with plastic sheet	• Cement storage process • Method to cover the cement in moisture proof place. • Procedure to get cement from moisture proof room • Design procedure for maintaining a moisture proof room	Theory-2 Hrs Practical-3 Hrs Total- 5 Hrs	Spirit level PPEs Thermometer Umbrella with stand	Class Room and lab

		• Safety procedure i.e.: use gloves, boots, helmet, apron and mask **Practical activity**: • Store cement bags using precautions in lab.			

0732B&CE-029. Select sand for construction

Objective: This module covers the knowledge and skills required for basics as construction granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Desert sand, although plentiful, is not suitable for concrete, and 50 billion tons of beach sand and fossil sand is needed each year for construction.

Duration: 5 Hours **Theory: 2 Hours** **Practice: 3 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Interpret acquire Sand	**Trainee will be able to:** • Identify material • Select quarry • Manage quarrying process • Use safety precautions for drawing • Produce sand	• Procedure to get sand from quarry**.** • Design procedure for maintaining quarry for sand. • Safety precaution to get and use of sand at construction site **Practical activity**: Prepare flow diagram of quarrying of sand in class room.	Theory-0.5 Hrs Practical-0.5 Hrs Total- 1 Hrs	Pencil, Eraser, Sharpner Calculator Measuring scale Drawing sheet	Class Room
LU2. Test sand for use	**Trainee will be able to:** • Select sand from heap • Find moisture content in sand. • Determine bulking of sand. • Find clay content in selected sand. • Find salts in sand	• Type of sand. • Sieving of sand ingredients. • Definition of Moisture content of sand. • Definition of bulking of sand. • Working of sand in concrete. • Working temperature of concrete.	Theory-1 Hrs Practical-1.5 Hrs Total- 2.5 Hrs	PPEs Umbrella with stand Glass jar Steel rod Steel scale Steel tray Drying oven	Class Room and lab

		• Safety procedure i.e: use gloves, boots, helmet, apron and mask **Practical activity**: Perform moisture content test, bulking test, also determine clay content and presence of salts using precautions in lab.		Steel pan	
LU3. Manage storage process of sand at site	**Trainee will be able to:** • Identify material • Use PPEs • Locate safe place • Dump sand • Cover with plastic sheet	• Sand storage process • Method to cover the sand and water sprinkling on sand. **Practical activity:** Store the sand at suitable place in lab.	Theory-0.5 Hrs Practical-1 Hrs Total- 1.5 Hrs	Plastic sheet Kassie PPEs	Class Room and lab

0732B&CE-030. Identify ferrous and non-ferrous metals

Objective: This module covers the knowledge and skills required for Non-Ferrous Metals do not contain Iron, are not magnetic and are usually more resistant to corrosion than ferrous metals. Some examples of Non-Ferrous Metals we deal which are Aluminum, Aluminum Alloys and Copper.

Duration: 8 Hours Theory: 2 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Identify ferrous metals	**Trainee will be able to:** • Identify materials • Select ferrous metals • Check iron particles • Perform magnetic operation • Use PPEs • Perform results	• Definition of ferrous metals • Method to perform strength for metals. • Description of different alloys • Design procedure for manufacturing of alloys • Safety precaution to manufacturing alloys • PPEs **Practical Activity:** Identify ferrous metals in lab using safety precautions.	Theory-1 Hrs Practical-3 Hrs Total- 4Hrs	Sheet plate Plate bar Plate rod Channels Forgings area Casting platform Furnace Handling equipment Float Blades Core cutting machine Groove Cutter Jointer Tool Drill Machines Polishers PPEs Thermometer Umbrella with stand	Class Room and lab

LU2. Identify Non-ferrous metals	**Trainee will be able to:** • Identify materials • Select non - ferrous metals • Check iron particles • Perform magnetic operation • Use PPEs • Perform results	• Definition of nonferrous metals • Type of nonferrous metals • Safe working process to cut the metals • Explanation of temperature zone for cutting metal. • Annealing process **Practical activity:** Identify non-ferrous metals using precautions in lab.	Theory- 1Hrs Practical-3 Hrs Total- 4 Hrs	Sheet plate Plate bar Plate rod Channels Forgings area Casting platform Furnace Handling equipment Float Blades Core cutting machine Groove Cutter Jointer Tool Drill Machines Polishers PPEs Thermometer Umbrella with stand with stand	Class Room and lab

0732B&CE-031. Identify advanced construction materials

Objective: This module covers the knowledge and skills required for Traditional construction materials, such as timber, steel, asphalt and Portland cement concrete are often used in many construction projects. Modern materials, such as. Polymers and composites are making headway into the construction industry on the ground are called "pavers"

Duration: 13 Hours Theory: 4 Hours Practice: 9 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Identify Timber	**Trainee will be able to:** • Identify materials • Select color for wood • Count annual rings • Check pith & rays • Select bark & sap wood • Perform results	• Explain Uses of different building materials in construction. • Describe and explain the different types of timber. • Define annual rings, pith and rays. • Explain safe working process to cut the timber **Practical activity:** Inspect timber.	Theory-0.5 Hrs Practical-1 Hrs Total- 1.5 Hrs		Class Room and construction lab

Identify steel	• Trainee will be able to: • Identify materials • Perform Tensile Strength. • Perform Ductility. • Check Malleability. • Monitor Durability. • Identify Conductivity. • Check Luster • Use PPEs	• Define steel • Describe and explain the types of steel. • Explain different uses of steel. • Describe different properties of steel. • Define luster. • Define conductivity. • Define ductility. • Define tensile strength. • Explain temperature zone for cutting different materials. • Explain safety precaution to manufacturing and finishing of steel. **Practical activity:** Perform steel tests.	Theory-0.5 Hrs Practical-2 Hrs Total- 2.5 Hrs	UTM Ductility testing machine Ohmmeter PPEs	Class Room and construction lab
Identify asphalt	**Trainee must be able to:** • Identify materials • Perform Brittleness • Perform Ductility • Check Hardening • Monitor Viscosity • Identify Conductivity • Check Luster	• Purpose of asphalt • Different properties of asphalt. • Definition of brittleness. • Definition of viscosity. • Definition of hardening **Practical activity**: Inspect asphalt.	Theory-1 Hrs Practical-2 Hrs Total- 3 Hrs	Viscometer Ductility testing Machine	Class Room and construction lab

	• Use PPEs				
Identify cement	**Trainee must be able to** • Indicate material • Check Fineness • Administer Soundness. • Monitor Consistency. • Check Strength. • Supervise Setting time. • Check Heat of hydration. • Study Loss of ignition. • Perform Bulk density. • Use PPES	• Definition of cements and types of cement. • Definition admixture and its purpose • Definition of fineness • Definition of consistency. • Definition of heat of hardness. • Manufacturing of cement. • Definition of bulk density. • Definition of setting time of cement. **Practical activity:** Perform test of cement in lab.	Theory-1 Hrs Practical-2 Hrs Total- 3 Hrs	Sieve set UTM Cylinder Rod Vicat apparatus Le chatelier apparatus	Class Room and construction lab
Identify glass	**Trainee must be able to** • Identify material • Check transparency, • Perform heat resistance • Check pressure • Indicate breakage resistance • Check chemical resistance. • Use PPEs	• Different types of glass. • Definition of transparency. • Definition of heat resistance of glass • Explanation of chemical resistance of glass. • Definition of breakage resistance of glass. • Different constituents of glass. • Effect of different oxides in glass. • Physical properties of glass.	Theory-1 Hrs Practical-2Hrs Total- 3 Hrs	Impact testing machine Glass testing tubes	Class Room and construction lab

		Practical activity: Perform various tests on glass.			

0732B&CE-032. Work Safely in Construction Industry

Objective: This module covers the knowledge and skills required to identify OHS legislative requirements, identify construction hazards and control measures, identify OHS communication and reporting processes and identify OHS incident response procedures.

Duration: 5 Hours Theory: 4 Hours Practice: 1 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Identify OHS legislative requirements.	**Trainee will be able to:** • Identify and explain applicable OHS legislative requirements relevant to own work, role and responsibilities. • Identify duty of care requirements. • Identify and explain Own responsibilities to comply with safe work practices	• Description of applicable Commonwealth, State or Territory OHS legislation, regulations, standards, codes of practice and industry standards/guidance notes relevant to own work, role and responsibilities • Description of types of common personal protective equipment and fire safety equipment **Practical activity:** Explain OHS legislative requirements.	Theory-1 Hrs Practical-0.25 Hrs Total- 1.25 Hrs		Class Room
Identify construction hazards and control measures.	**Trainee will be able to:** • Identify basic principles of risk management. • Identify & discuss Common construction hazards.	• Description basic principles of risk management and assessment for construction work.	Theory-1 Hrs Practical-0.25 Hrs Total- 1.25 Hrs		Class Room

	• Identify Measures for controlling hazards and risks.	• Description common construction hazards, common construction safety signage and its meanings **Practical activity:** Explain construction hazards and their control measures.			
Identify OHS communication and reporting processes.	**Trainee must be able to:** • Identify materials • Identify & discuss OHS communication processes, information and documentation. • Identify & explain role of designated OHS personnel. • Identify & explain Safety signs and symbols. • Identify & discuss Procedures and relevant authorities for reporting hazards, incidents and injuries are identified.	• Explanation of Types of OHS information and documentation. • Explanation of general procedures for reporting OHS hazards, accidents, incidents, emergencies, injuries, near misses and dangerous occurrences. • Steps of general procedures for responding to hazards, incidents and injuries. **Practical activity:** Explain reporting procedure of hazards and safety. signs and symbols	Theory-1 Hrs Practical-0.25 Hrs Total- 1.25 Hrs		Class Room
Identify OHS incident response procedures.	**Trainee must be able to**	• Explanation of OHS hierarchy of controls, OHS responsibilities and rights of duty holders.	Theory-1 Hrs Practical-0.25 Hrs	PPEs	Class Room and

	• Identify & explain General procedures for responding to incidents and emergencies. • Identify procedures for accessing first aid. • Identify & demonstrate requirements for the selection and use of relevant personal protective equipment. • Identify & discuss Fire safety equipment.	• Description of own responsibilities to comply with safe work practices relating to: housekeeping, identification of hazards, preventing bullying or harassment, smoking, use of amenities, use of drugs and alcohol • Describe persons in control of construction work/projects- employers and self-employed persons, supervisors, employees, designers, inspectors and manufacturers and suppliers • Describe general workers' compensation and injury management requirements • Describe general first aid response requirements and general procedures for raising OHS issues. **Practical activity:** Perform the use of PPEs, fire safety equipment's and first aid procedure in lab.	Total- 1.25 Hrs		constructi on lab

0732B&CE-033. Interpret Simple Building Plans

Objective: This module covers the knowledge and skills required to locate, interpret and apply relevant information standards of simple building plans.

Duration: 5Hours Theory: 2 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Identify types of drawings and their functions.	**Trainee will be able to:** • Main types of plans and drawings used in the construction sector of the industry are identified. • Key features and functions of each type of drawing are identified. • Quality requirements of company operations are recognized and adhered to. • Environmental requirements and controls are identified from job plans, specifications and environmental plan.	• Description of the features of plans and elevations, including direction, scale, key, contours, symbols and abbreviations **Practical activity:** Prepare a list of different working drawings for house.	Theory-1 Hrs Practical-1 Hrs Total- 2 Hrs	Calculator Pencil Ruler	Class Room
Recognize amendments.	**Trainee will be able to:** • Title panel of project documentation is checked to verify latest amendments to drawing.	Description of construction terminology. • Drawing conventions **Practical activity:**	Theory-0.5 Hrs Practical-1 Hrs Total- 1.5 Hrs	Calculator Pencil Ruler	Class Room

	• Amendments to specifications are checked to ensure currency of information and conveyed to others where appropriate.	Draw a typical lay out of drawing sheet with title block.			
Recognize commonly used symbols and abbreviations.	**Trainee must be able to:** • Construction symbols and abbreviations are recognized. • Legend is located on project drawings, and symbols and abbreviations are correctly interpreted.	• Commonly used construction symbols and abbreviations **Practical activity:** Draw construction symbols on drawing sheet.	Theory-0.5 Hrs Practical-1 Hrs Total- 1.5 Hrs	Calculator Pencil Ruler	Class Room

0732B&CE-034. Read and Interpret plans and Specifications

Objective: This module covers the knowledge and skills required to read, interpret plans and specifications.

Duration: 5 Hours Theory: 2 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Identify types of drawings and their functions.	**Trainee will be able to:** • Main types of plans and drawings used in the construction sector of the industry are identified. • Key features and functions of each type of drawing are identified. • Quality requirements of company operations are recognized and adhered to. Environmental requirements and controls are identified from job plans, specifications and environmental plan.	• Description of the features of plans and elevations, including direction, scale, key, contours, symbols and abbreviation. • Basic calculations of heights, areas, volumes and grades **Practical activity:** Identify types of drawings and their functions of given plan of a 5 marla house	Theory-0.33 Hrs Practical-0.5 Hrs Total- 0.83 Hrs	Pencil Ruler Calculator	Class Room
Recognize amendments	**Trainee will be able to:** • Title panel of project documentation is checked to verify latest amendments to drawing. • Amendments to specifications are checked to ensure currency of	• Processes for application of scales in plan preparation and interpretation • Description of construction terminology.	Theory-0.33 Hrs Practical-0.5 Hrs Total- 0.83 Hrs	Pencil Ruler Calculator	Class Room

	information and conveyed to others where appropriate	• Understanding of drawing conventions **Practical activity:** Label different amendments and specification of given plan of a 5 marla house.			
Recognize commonly used symbols and abbreviations.	**Trainee must be able to:** • Construction symbols and abbreviations are recognized. • Legend is located on project drawings, and symbols and abbreviations are correctly interpreted.	• Explain commonly used construction symbols and abbreviations **Practical activity:** Recognize commonly used symbols and abbreviations	Theory-0.33 Hrs Practical-0.5 Hrs Total- 0.83 Hrs	Pencil Ruler Calculator	Class Room
Locate and identify key features on a site plan.	**Trainee must be able to** • Orientation of the plan with the site is achieved. • Key features of the site are identified and located. • Access to site is gained and services, main features, contours and datum are identified.	• Site and equipment safety (OHS) requirements • Techniques for orienting/confirming the orientation of a plan. **Practical activity:** Mark the north and identify key features on a site plan.	Theory-0.33 Hrs Practical-0.5 Hrs Total- 0.83 Hrs	Pencil Ruler Calculator	Class Room
Identify project requirements.	**Trainee must be able to**	• Job safety analysis (JSA) and safe work method statements	Theory-0.33 Hrs	Pencil Ruler	Class Room

	• Dimensions for project and nominated locations are identified. • Construction types and dimensions for nominated locations are identified. • Environmental controls and locations are identified. • Location, dimensions and tolerances for ancillary works are identified.	• key features of formal job specifications. **Practical activity:** • Identify project requirements.	Practical-0.5 Hrs Total- 0.83 Hrs	Calculator	
Read and interpret job specifications.	**Trainee must be able to** • Job specifications are identified from drawings, notes and descriptions. • Standards of work, finishes and tolerances are identified from the project specifications. • Material attributes are identified from specifications.	• project quality requirements **Practical activity:** Read and interpret job specifications of given plan.	Theory-0.33 Hrs Practical-0.5 Hrs Total- 0.83 Hrs		

0732B&CE-035. Apply power and hand tools in construction

Objective: This module covers the knowledge and skills required to identify and select hand, power and pneumatic tools for given tasks and safely use and maintain a minimum of rule, tape, square, hammer, hand saw, hand plane, chisel, shovel, wheelbarrow, sledge hammer, pick, mattock and crow bar and pinch bar for given tasks.

Duration: 5 Hours Theory: 2 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan and prepare	**Trainee will be able to:** • Work instructions are confirmed with supervisor. • Tools and equipment are selected as required, checked for serviceability and any faults are fixed or reported. • Safety requirements, and warnings, including use of personal protective equipment, are observed throughout the work	• Explanation Workplace and equipment safety requirements • Description of Construction terminology, particularly names of tools and equipment **Practical activity:** Plan a drilling activity and fastening nails with hammer in a wall in lab.	Theory-0.75 Hrs Practical-1 Hrs Total- 1.75 Hrs	Pencil Ruler Calculator	Class Room and construction lab
LU2. Identify and select hand, power and pneumatic tools	**Trainee will be able to:** • Hand tools and power and pneumatic tools, their functions, operations and limitations are identified and selected • Safety requirements are applied when using hand, power and pneumatic tools.	• Classification of stores- stock, tools and plants, Road metal and materials charged direct to the work. **Practical activity:**	Theory-0.5 Hrs Practical-0.5 Hrs Total- 1 Hrs	Measuring tape Drilling machine Nail PPEs	Construction Lab

	• Pre-operational checks, including lubricants, hydraulic fluid and water, are completed according to manufacturer recommendations.	Select tools and PPEs for a drilling activity and fastening nails in a wall in lab.		Hammer	
LU3. Use tools safely and effectively	**Trainee must be able to:** • Hand tools used are appropriate to the task and used effectively • Power and pneumatic tools are safely and effectively used in accordance with manufacturer recommendations. • Tools are sharpened and maintained.	• Describe Manual handling and correct posture for tool and equipment use • Personal protective equipment and reasons for its use **Practical activity:** Use PPEs and fasten nails with hammer in wall in lab.	Theory-0.25 Hrs Practical-0.5 Hrs Total- 0.75 Hrs	Measuring tape Nail PPEs Hammer	Construction Lab
LU4. Identify, select and use plant and equipment	**Trainee must be able to** • Plant and equipment are selected and used consistent with OHS requirements and the needs of the job. • Pre-operational checks, including lubricants, hydraulic fluid and water, are completed.	• Workplace and equipment safety requirements **Practical activity**: • Use PPEs and drill holes in wall in lab	Theory-0.25 Hrs Practical-0.5 Hrs Total- 0.75 Hrs	Drilling machine Measuring tape Nail PPEs	Construction Lab
LU5. Clean up.	**Trainee must be able to** • Work area is cleaned and waste disposed of, reused or recycled in accordance with work specifications.	• Explanation of need for store in a project • classification of stores- stock • Practical activity:	Theory-0.25 Hrs Practical-0.5 Hrs	Broom Duster	Construction Lab

	• Tools plant and equipment are cleaned, checked for faults and maintained and stored in accordance with workplace practices	• Clean the area and tools and store it in proper storage area in lab.	Total- 0.75 Hrs		

9.4. Workshop Practice - I (wood working)

0732B&CE-036. Carry out OH & S requirement in workshop

Objective: This module covers the skills and knowledge required to assess risks, plan and prepare for safe work practices, maintain safety of self and others, apply emergency response and cleanup work site area.

Duration: 5 Hours Theory: 2 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Assess risks	**Trainee will be able to:** • Identify hazards in the work area • Identify OHS issues and risks in the work area • Complete reports on OHS, hazard, accident or incident	• Explanation of work shop orientation • Difference between hazard and risk • State risks in woodwork shop • Safety precautions for wood workshop **Practical activity:** Identify & report hazards in wood workshop	Theory- 0.3 hours Practice- 0.5 hours Total- 0.8 hours	Paper Pencil Eraser	Class Room and wood workshop
LU2. Plan and prepare for safe work practices	**Trainee will be able to:** • Select personal protective equipment (PPE)	• Explanation of the purpose of personal protective equipment	Theory-0.3 hours	Paper Pencil Eraser	Class Room

	• Select tools and equipment consistent with safe work practice requirements • Determine and erect required barricades, hoardings and signage • Identify and apply Material safety data sheets (MSDS)	• Description of types of personal protective equipment **Practical activity:** Identify Personal Protective Equipment	Practice- 0.5 hours Total- 0.8 hours	**T & E:** Ear Muff, Ear Plug Safety shoes Gloves Safety Goggles Safety Helmet Respiratory protective equipment i.e. Masks Life Jacket High visibility jacket Safety harness Face shield Long shoes	and wood workshop
LU3. Maintain safety of self and others	**Trainee will be able to:** • Identify safety signs in terms of color and shape, symbols and alarms • Identify, handle and store hazardous chemicals and materials maintaining the safety to self, others and the environment	• State the safety symbols • Handling & storage of hazardous chemicals • Causes of accidents in industry • Explanation of the remedial measures to avoid accidents in industry **Practical activity:** Demonstrate the application of PPE	Theory-0.8 hours Practice- 1 hours Total- 1.8 hours	Paper Pencil Eraser Safety signs	Class Room and wood workshop

	• Identify common causes of accidents in the industry • Implement prevention measures for accidents				
LU4. Apply emergency response	**Trainee will be able to** • Identify emergencies • Provide emergency response in accordance to requirements • Report detail of actions taken	• Explanation of principle of first aid • State emergency situations in work area. **Practical activity:** Perform first aid for emergency situations i.e wound, burn, CPR etc.	Theory-0.3 hours Practice- 0.5 hours Total- 0.8 hours	Paper Pencil Eraser **T & E:** Ear Muff, Ear Plug Safety shoes Gloves Safety Goggles Safety Helmet Respiratory protective equipment i.e. Masks Life Jacket High visibility jacket Safety harness Face shield Rubber shoes/ long shoes	Class Room and wood workshop
LU5. Clean up work site area	**Trainee will be able to**	• State the purpose of cleaning & maintenance of work area.	Theory-0.3 hours	Dusting clothes Mopes	Class Room &

	• Clear work area by disposing of materials (reused or recycled) in accordance to legislation and regulations • Clean, check, maintain and store tools and equipment according to requirement	• Explanation of the disposal of waste material **Practical activity:** Perform cleaning, maintenance and storage of used tools & equipment.	Practice- 0.5 hours Total- 0.8 hours	Oil & grease **T & E:** Disposal box Disposal bucket Vipers Brushes	wood workshop

0732B&CE-037. Determine properties and types of locally manufactured timber

Objective: This module covers the skills and knowledge required to identify type of timber, determine specific gravity of timber, find out moisture content of timber and determine compressive strength of timber.

Duration: 8 Hours Theory: 2 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Identify type of timber	**Trainee will be able to:** • Recognize color and odor of locally produced timber • Prepare a list of locally produced timber in accordance with color and odor • Identify type of given timber sample	• Enlist the different types of timber • Explanation of structure and growth of timber • Description of defects and decay of timber. **Practical Activity:** Identify type of timber from given sample.	Theory-0.5 Hrs Practice-1 Hrs Total-1.5 Hrs	Different types of Timber	Class Room and wood workshop
LU2. Determine specific gravity of timber	**Trainee will be able to:** • Identify tools and equipment • Measure dimensions of sample • Weigh sample • Calculate specific gravity of timber by computing density	• Describe the purpose of specific gravity • Explanation of procedure of determining specific gravity of timbre **Practical Activity:** Perform specific gravity test for given sample of timber	Theory-0.5 Hrs Practice- 1 Hrs Total- 1.5 Hrs	Timber **T & E:** Specific gravity apparatus	Class Room and wood workshop

LU3. Find out moisture content of timber	**Trainee will be able to:** • Identify tools and equipment • Weigh sample before oven drying • Weigh sample after drying sample • Calculate moisture content	• Purpose of moisture content test • Explanation of procedure of determining moisture content of timber **Practical Activity:** Perform moisture content test for given sample timber	Theory-0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Timber **T & E:** Digital balance Electric oven	Class Room and wood workshop
LU4. Determine compressive strength of timber	**Trainee will be able to:** • Identify tools and equipment • Assemble sample in equipment by placing sample perpendicular to grain • Find out compressive strength according to specification • Repeat process by placing sample parallel to grain Interpret compressive strength	• Necessity of compressive strength test • Explanation of procedure of determining compressive strength of timber **Practical Activity:** Perform compressive strength test for given sample of timber	Theory-0.5 Hrs Practice-2 Hrs Total- 2.5 Hrs	Timber **T & E:** Compression Testing Machine	Class Room and wood workshop

0732B&CE-038. Sharpen carpentry tools

Objective: This module covers the knowledge and skills required to identify tools used in carpentry and perform sharpening of carpentry tools.

Duration: 7 Hours Theory: 1 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Identify tools used in carpentry	**Trainee will be able to:** • Recognize tools used in carpentry • Identify tools needed to be sharpen	• Tools used in wood workshop • Describe the use of tools in wood workshop **Practical Activity:** Identify tools used in carpentry	Theory-0.5 Hrs Practice- 2 Hrs Total- 2.5 Hrs	**T & E:** Wood tool Marking tools Holding tool Cutting tool Planning tool Measuring tool	Class Room and wood workshop
LU2. Perform sharpening of carpentry tools	**Trainee will be able to:** • Identify tools and equipment • Perform plane iron sharpening • Perform chisel sharpening • Perform scraper sharpening • Perform router bit sharpening	• State the purpose of sharpening of tools • Describe the procedure of sharpening of tools **Practical Activity:** Demonstrate sharpening of carpentry tools	Theory-0.5 Hrs Practice-4 Hrs Total- 4.5 Hrs	Files Diamond stones Water stones Oil stones Ceramic stones **T & E:** Wood tool Marking tools Holding tool	Class Room and wood workshop

	• Perform craving tool sharpening			Cutting tool Planning tool Measuring tool	

0732B&CE-039. Apply hand tools

Objective: This module covers the knowledge and skills required to identify, select hand tools, use tools & clean the tools.

Duration: 7 Hours Theory: 1 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Identify and select hand tool	**Trainee will be able to:** • Identify and select hand, power and pneumatic tools, their functions, operations and limitations • Recognize OHS requirements for using hand tools	• Hand tools used in wood workshop • Description of use of hand tools in wood workshop **Practical Activity:** Identify hand tools used in carpentry	Theory-0.3Hrs Practice-1Hrs Total- 1.3Hrs	**T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room and workshop
LU2. Apply tools	**Trainee will be able to:** • Use hand tools appropriate to the task and materials and are in accordance with OHS requirements • Sharpen and maintain tools	• Uses of hand tools in wood workshop • OHS requirements while using tools. **Practical Activity:** Perform operations of hand tools	Theory-0.3Hrs Practice-4 Hrs Total- 4.3 Hrs	**T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room and wood workshop
LU3. Clean up	**Trainee will be able to:** • Clear work area and dispose materials (reused or recycled) in accordance with legislation,	• Purpose of cleaning & maintenance of work area. • Explanation of the disposal of waste material	Theory-0.3 Hrs Practice-1 Hrs Total- 1.3 Hrs	Dusting clothes Mopes Oil & grease **T & E:**	Class Room and wood workshop

	regulations, and codes of practice and job specification. • Clean, check, maintain and store tools according to requirement	**Practical activity:** Perform cleaning, maintenance and storage of used tools & equipment's		Disposal box Disposal bucket Vipers Brushes	

0732B&CE-040. Perform wooden joinery work

Objective: This module covers the knowledge and skills required to make butt, biscuit, miter, edge, dovetail, mortise and tenon and dado joint.

Duration: 8 Hours Theory: 2 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Make butt joint	**Trainee will be able to:** • Identify butt joint • Cut timber according to requirement of butt joint • Join cut pieces according to requirement	• Steps for making a butt joint • Procedure for making a butt joint **Practical activity:** Prepare butt joint	Theory-0.25 Hrs Practice-0.5 Hrs Total- 0.75 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room and workshop
LU2. Perform biscuit joinery	**Trainee will be able to:** • Identify biscuit joint • Cut timber according to requirement of biscuit joint • Join cut pieces according to requirement	• Steps for making a biscuit joint • Procedure for making a biscuit joint **Practical activity:** Prepare biscuit joint	Theory-0.25 Hrs Practice-0.5 Hrs Total- 0.75 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool	Class Room and wood workshop

				Cutting tool Planning tool	
LU3. Make Miter joint	**Trainee will be able to:** • Identify miter joint • Cut timber according to requirement of miter joint • Join cut pieces according to requirement	• Steps for making a miter joint • Procedure for making a miter joint **Practical activity:** Prepare miter joint	Theory-0.25 Hrs Practice-1Hrs Total- 1.25 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room and wood workshop
LU4. Make Edge joint	**Trainee will be able to** • Identify edge joint • Cut timber according to requirement of edge joint • Join cut pieces according to requirement	• Steps for making a edge joint • Procedure for making a edge joint **Practical activity:** Prepare edge joint	Theory-0.25 Hrs Practice-1Hrs Total- 1.25 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room and wood workshop

LU5. Make dove tail joint	**Trainee will be able to** • Identify dove tail joint • Cut timber according to requirement of dove tail joint • Join cut pieces according to requirement	• Steps for making a dove tail joint • Procedure for making a dove tail joint **Practical activity:** Prepare dove tail joint	Theory-0.25 Hrs Practice-1 Hrs Total- 1.25 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room & wood workshop
LU6. Make Mortise & tenon joint	**Trainee will be able to** • Identify Mortise & tenon joint • Cut timber according to requirement of mortise & tenon joint • Join cut pieces according to requirement	• Steps for making a Mortise & tenon joint • Procedure for making a Mortise & tenon joint **Practical activity:** Prepare Mortise & tenon joint	Theory-0.5 Hrs Practice-1 Hrs Total- 1.5 Hrs	Timber Nails Glue **T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	Class Room & wood workshop
LU7. Make dado joint	**Trainee will be able to** • Identify dado joint	• Steps for making a dado joint • Procedure for making a dado joint	Theory-0.25 Hrs Practice-1 Hrs	Timber Nails Glue	Class Room &

	• Cut timber according to requirement of dado joint • Join cut pieces according to requirement	**Practical activity:** Prepare dado joint	Total- 1.25 Hrs	**T & E:** Wood tool Measuring tool Marking tools Holding tool Cutting tool Planning tool	wood workshop

0732B&CE-041. Apply fastenings

Objective: This module covers the knowledge and skills required to prepare hole, Identify fastenings and apply fastenings.

Duration: 4 Hours Theory: 1 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare hole	**Trainee will be able to:** • Identify and select power and pneumatic tools for making hole • Perform boring to make hole in accordance with OHS requirement	• State the types of power tools • Enlist the types of pneumatic tools • Explanation of the procedure for boring **Practical Activity:** Make hole for fastening	Theory-0.3 Hrs Practice- 1 Hrs Total- 1.3 Hrs	Different types of fastening **T & E**: Fastening tools Boring machine	Class Room and workshop
LU2. Identify fastenings	**Trainee will be able to:** • Identify and select appropriate fastening • Identify and select tools for fastenings	• State the uses of fastenings • Enlist the types of fastenings **Practical Activity:** • Identify fastenings	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Different types of fastenings **T & E:** Fastening tools Boring machine Fastening	Class Room and wood workshop
LU3. Apply fastenings	**Trainee will be able to:** • Insert fastening in hole prepared before • Use tools for fastenings	• Explanation of the procedure for inserting fastening in hole **Practical Activity:** Install fastenings in hole	Theory-0.3 Hrs Practice-1.5 Hrs Total- 1.8 Hrs	Different types of fastenings **T & E:** Fastening tools Boring machine	Class Room and wood workshop

				Fastening	

0732B&CE-042. Apply traditional spirits polishing techniques

Objective: This module covers the knowledge and skills required to Plan and prepare for work, Prepare for application of polish, Skin in job surface, Body up a skinned in surface, Spirit off/stiffen up surface and Clean up.

Duration: 5 Hours Theory: 2 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan and prepare for work	**Trainee will be able to:** • Identify work requirements correctly from drawings/specifications/instructions • Recognize quality assurance requirements • Observe OHS requirements, including personal protection needs throughout the work • Select tools and equipment consistent with job requirements and work instructions • Prepare skinning in, bodying up and spiriting out/stiffening up rubbers consistent with the requirements of the work	• Explanation of the purpose of spirits in timber work • Explanation of the purpose of polish in timber work • Describe the purpose of skinning inn, bodying up and stiffing up • State the safety requirements while spirit & polish work **Practical activity:** Select tools & equipment relevant material as per requirement	Theory-0.5 Hrs Practice-0.5 Hrs Total- 1 Hrs	Glue Fastener Sprit polish Lacquering and paints	Class Room and workshop

LU2. Prepare for application of polish	**Trainee will be able to:** • Check surfaces for contamination and correct preparation according to workplace procedures and standards • Identify products with surface or other faults • Identify techniques for hand application of polish using traditional methods • Prepare materials and equipment suitable for skinning in, bodying up and spiriting out/stiffening up operations are • Stain, fill in and seal surfaces with polish using a mop brush, blender or swooge	• Describe the steps for application of polish • Explanation of the techniques for application of polish **Practical activity:** Prepare the surface of timber for polish	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Glue Fastener Sprit polish Lacquer Paints	Class Room and wood workshop
LU3. Skin in job surface	**Trainee will be able to:** • Sand surface lightly • Skinning in rubber is suitably charged with polish having regard for job color and clarity • Skin in surface covering small areas at a time, using correct amount of	• State the purpose of skin in job • Describe the procedure of skinning up **Practical activity:** Perform skinning in of timber surface	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Glue Fastener Sprit polish Lacquer Paints	Class Room and wood workshop

	pressure and suitable rubber movements • Apply pumice powder as necessary in accordance with workplace procedures • Inspect skinned in surface				
LU4. Body up a skinned in surface	**Trainee will be able to** • Use polish, lubricating oil and pumice powder is used to body up the skinned in surface, using correct amount of pressure and suitable rubber movements • Monitor and evaluate rubber and job surface continuously • Recharge body up rubber and lubricating oil • Applied pumice as necessary to ensure surface faults and blemishes do not develop	• State the purpose of bodying up a skinned surface • Describe the procedure of bodying up a skinned surface **Practical activity:** Perform bodying up a skinned surface	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Glue Fastener Sprit polish Lacquer Paints	Class Room and wood workshop
LU5. Spirit off/stiffen up surface	**Trainee will be able to** • Stiffen up/spirit off surface using correctly charged rubber, correct	• State the purpose of Spirit off/stiffen up surface • Describe the procedure of Spirit off/stiffen up surface	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Glue Fastener Sprit polish Lacquer	Class Room & wood workshop

	amount of pressure and suitable rubber movements • Show no blemishes or rubber marks	**Practical activity:** Perform Spirit off/stiffen up surface		Paints	
LU6. Clean up	**Trainee will be able to** • Clear workplace of debris and unused materials • Store rubbers separately in airtight glass or plastic containers in accordance with workplace procedures • Clean, maintain and store tools and equipment	• State the purpose of cleaning & maintenance of work area. • Explanation of the disposal of waste material **Practical activity:** Perform cleaning, maintenance and storage of used tools & equipment's	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Dusting clothes Mopes Oil & grease T & E: Disposal box Disposal bucket Vipers Brushes	Class Room & wood workshop

0732B&CE-043. Apply portable power tools

Objective: This module covers the knowledge and skills required to assess risks, plan and prepare for safe work practices, maintain safety of self and others, apply emergency response and cleanup work site area.

Duration: 4 Hours Theory: 1 Hours Practice: 3 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Identify and select power and pneumatic tools	**Trainee will be able to:** • Identify and select power and pneumatic tools, their functions, operations and limitations • Recognize OHS requirements for using power and pneumatic tools • Check lubricants, hydraulic fluid and water according to manufacturer recommendations	• Power and pneumatic used in wood workshop • Description of use of power and pneumatic in wood workshop **Practical Activity:** Identify power and pneumatic tools	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	**T & E:** Circular SAW W.W, Planer Wood Turning lathe Spindle Boring machine Sander	Class Room and workshop
LU2. Apply Tools	**Trainee will be able to:** • Use hand tools appropriate to the task and materials and are in accordance with OHS requirements • Use power and pneumatic tools are safely and effectively in accordance with	• Uses of power and pneumatic tools in wood workshop • OHS requirements while using tools. **Practical Activity:**	Theory-0.3 Hrs Practice-2 Hrs Total- 2.3 Hrs	**T & E:** Circular SAW W.W, Planer Wood Turning lathe Spindle	Class Room and wood workshop

	manufacturer recommendations and state or territory OHS requirements • Sharpen and maintain tools	Perform operations of power and pneumatic tools		Boring machine Sander	
LU3. Clean up	**Trainee will be able to:** • Clear work area and dispose materials (reused or recycled) in accordance with legislation, regulations and codes of practice and job specification. • Clean, check, maintain and store plant, tools and equipment according to requirement	• Purpose of cleaning & maintenance of work area. • Explanation of the disposal of waste material **Practical activity:** Perform cleaning, maintenance and storage of used tools & equipment's	Theory-0.3 Hrs Practice-0.5 Hrs Total- 0.8 Hrs	Dusting clothe Mopes Oil & grease **T & E:** Disposal box Disposal bucket Vipers Brushes	Class Room and wood workshop

0732B&CE-044. Make simple calculations of timber

Objective: This module covers the knowledge and skills required to prepare a drawing of product and estimate timber quantity.

Duration: 8 Hours Theory: 2 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare a drawing of product	**Trainee will be able to:** • Identify drawing tools • Perform basics of drawing • Draw plan, cross section and elevation of product	• Enlist drawing tools • State the purpose of tools • Explanation of types of drawings • Describe the steps for drawing of timber product **Practical Activity:** Develop a drawing of product	Theory-1 Hrs Practice-3 Hrs Total- 4 Hrs	Pencil Paper Eraser Drawing Sheet **T & E:** Drafting tools Drafting table	Class Room and workshop
LU2. Estimate timber quantity	**Trainee will be able to:** • Identify components of product • Recognize timber requirement for specific components of product Calculate quantities of timber	• Explanation of the measurement of timber log and board • Explanation of the procedure for estimation of timber **Practical Activity:** Estimate timber quantity from drawing	Theory-1 Hrs Practice-3 Hrs Total- 4 Hrs	Pencil Paper Eraser Drawing Sheet **T & E:** Drafting tools Drafting table Calculator	Class Room and wood workshop

0732B&CE-045. Construct a basic timber product

Objective: This module covers the knowledge and skills required to construct a basic timber product.

Duration: 8 Hours Theory: 2 Hours Practice: 6 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Estimate timber quantity	**Trainee will be able to:** • Prepare a drawing of product • Identify components of product • Recognize timber requirement for specific components of product • Calculate quantities of timber	• Planning for product construction • Selection of timber • Description of cutting of timber • Joinery work • Understanding of Fastenings • Explanation of polishing **Practical Activity:** Estimate timber quantity from drawing	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Pencil Paper Eraser Drawing Sheet T & E: Drafting tools Drafting table Calculator	Class Room and workshop
LU2. Prepare timber for joinery work	**Trainee will be able to:** • Cut timber according to drawing/specifications • Perform necessary work for joints	• States the steps for making timber joints • Describe the procedure for making timber joints **Practical activity:** Make timber joints	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Timber Nails Glue T & E: Wood tool Measuring tool Marking tools	Class Room and wood workshop

				Holding tool Cutting tool Planning tool	
LU3. Apply fastenings	**Trainee will be able to:** • Prepare holes • Apply fastenings	• Process of boring • Techniques for installation of fastenings **Practical activity:** Install fastenings in the hole	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Different types of fastenings T & E: Fastening tools Boring machine Fastening	Class Room and wood workshop
LU4. Apply polish	**Trainee will be able to** • Prepare surface for polishing • Skin in job surface • Body up a skinned surface • Spirit off/stiffen up surface	• Procedure for surface polishing • Procedure for skinning job surface • Procedure for body up a skinned surface • Procedure for Spirit off/stiffen up surface **Practical Activity:** Apply polish on timber surface	Theory-0.5 Hrs Practice-1.5 Hrs Total- 2 Hrs	Different types of fastenings T & E: Fastening tools Boring machine Fastening	Class Room and wood workshop

9.5. Workshop Practice - II (Electrical Wiring)

0732B&CE-046. Carry Out Oh & S Requirement in Workshop

Objective: This module covers the skills and knowledge required to assess risks, plan and prepare for safe work practices, maintain safety of self and others, apply emergency response and cleanup work site area.

Duration: 08 Hours Theory: 02 Hours Practice: 06 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Assess risks	Trainee will be able to: Identify hazards in the work area Identify OHS issues and risks in the work area Complete reports on OHS, hazard, accident or incident	Definition of Hazards Definition of Risks Techniques of identification of hazards & risks in the work are Preparation of reports on OHS, hazard, accident or incident	Theory- 01 Hrs Practical- 01Hrs Total-02 Hrs	Charts of hazards & risks Template / Performa's of report	Class Room and workshop
LU2. Plan and prepare for safe work practices	Trainee will be able to: Select personal protective equipment (PPE) Select tools and equipment consistent with safe work practice requirements	Definition of PPE Importance of safe work Definition of barricades, hoardings and signage Demonstration of erection of barricades, hoardings and signage	Theory-0 Hrs Practical-01 Hrs Total-01 Hrs	PPE's Tools & equipment's barricades, hoardings and signage	Class Room and workshop

	Determine and erect Required barricades, hoardings and signage Identify and apply Material safety data sheets (MSDS)	Practicing of erection of barricades, hoardings and signage Prepare material safety data sheet			
LU3. Maintain safety of self and others	Trainee will be able to: Identify safety signs in terms of colour and shape, symbols and alarms Identify, handle and store hazardous chemicals and materials maintaining the safety to self, others and the environment Identify common causes of accidents in the industry Implement prevention measures for accidents	Definition of safety signs in terms of colour, shapes, symbols & alarms Definition of hazardous chemicals & materials Effects of hazardous materials on to self, others and environment Common causes of accidents in the industry Demonstration of preventive measures for accidents Practicing of preventive measures for accidents	Theory-01 Hrs Practical-01 Hrs Total-02 Hrs	Safety signs PPE's Tools & Equipment's	Class Room and workshop
LU4. Apply emergency response	Trainee will be able to: Identify emergencies Provide emergency response in accordance to requirements Report detail of actions taken	Definition of emergency Effects of emergency response Preparation of report of action taken in emergency Practicing	Theory-00 Hrs Practical-02 Hrs Total-02 Hrs	Performa of report	Class Room and workshop
LU5. Clean up work site area	Trainee will be able to: Clear work area by disposing of materials (reused or recycled) in	Definition of reuse and recycle Definition of legislation & regulation Distinguish clean, check, maintain & store	Theory-00 Hrs Practical- 01Hrs Total-01 Hrs	PPE's Tools Duster	Class Room

	accordance to legislation and regulations Clean, check, maintain and store tools and equipment according to requirement	Demonstration of cleaning, checking, maintaining & storing tools & equipment's Practicing		Blower Oil Rust remover agent	and workshop

0732B&CE-047. Maintain Safety

Objective: This competency standard covers the skills and knowledge required to use electricity safely and treat against electric shock

Duration: 08 Hours Theory: 02 Hours Practice: 06 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Use electricity safely	Trainee will be able to: Determine safest supply and route for electrical supply Support and place lead in accordance with regulations. Conduct check on power board visually Check leads and equipment for tags and visual damage identify and report electrical hazards	Definition of safety supply Definition of route of electrical supply Importance of placing leads in accordance with regulations Importance of physical checking of power board Techniques of checking leads & equipment's for tags & visual damage Prepare report of electrical hazards Practicing	Theory- 01Hrs Practical-03 Hrs Total-04 Hrs	PPE's Tags Performa of report of electrical hazards	Class Room and workshop
LU2. Treat against electric shock	Trainee will be able to: Turn off the source of electricity, if possible. If not, move the source away from you and the person, using a dry, non-conducting object made of cardboard, plastic or wood	Demonstration of treatment against electric shock Practicing of treatment against electric shock Demonstration of CPR Practicing of CPR	Theory- 01Hrs Practical-03 Hrs Total-04 Hrs	PPE's Chart of treatment against electric shock Chart of CPR First Aid Box	Class Room and workshop

	Begin CPR if the person shows no signs of circulation, such as breathing, coughing or movement Try to prevent the injured person from becoming chilled Apply a bandage. Cover any burned areas with a sterile gauze bandage, if available, or a clean cloth. Don't use a blanket or towel, because loose fibers can stick to the burns.	Demonstration to prevent the injured person from becoming chilled Practicing to prevent the injured person from becoming chilled Demonstration of bandage Practicing of bandage			

0732B&CE-048. Perform Electrical Wiring

Objective: This competency standard covers the skills and knowledge required to Interpret Drawing, Arrange Resources for electrical wiring, Perform Wiring (Domestic & Industrial), termination and tagging, Perform Wire Dressing, and Perform Checking & Testing of electrical wiring.

Duration: 12 Hours Theory: 03 Hours Practice: 09 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU.1 Interpret Drawing	Trainee will be able to: Differentiate between control and power wiring as per job requirement Perform preliminary marking before termination of cables Follow drawing to perform wiring and for reporting/record purpose	Definition of control wiring Definition of power wiring Importance of preliminary marking before termination of cables Demonstration of marking by following drawing Practicing of marking by following drawing	Theory-01 Hrs Practical-02 Hrs Total-03 Hrs	Drawing of control wiring Drawing of power wiring	Class Room and workshop
LU.2 Arrange Resources for electrical wiring	Trainee will be able to: Enlist and arrange tools and material as per job Arrange work permit for the wiring task Arrange backup resources for lighting, power and safety purposes as per job requirement	Preparation of list of material and tools as per job Preparation of work permit Arrangement of backup resources for light, power etc. Practicing	Theory-00 Hrs Practical-02 Hrs Total-02 Hrs	Performa of work permit Sheet to record arrangement of backup resources PPE's	Class Room and workshop
LU.3 Perform Wiring (Domestic &	Trainee will be able to:	Definition of Wiring methods: Concealed	Theory-01 Hrs	Charts / display boards showing	Class Room and workshop

Industrial), termination and tagging	Perform Wiring using following methods: Concealed Conduit Bus way Open Duct Follow procedure to remove insulation and to attach thimbles Perform different types of terminations including High tension (HT) Low tension (LT) Control shrouding Sleeves Perform different types of joints High tension Low tension Water proof/underground Open Attach tags or numbers to wires for identification	Conduit Bus way Open Duct Demonstration of insulation removing and thimble pressing Practicing of insulation removing and thimble pressing Demonstration of terminations Practicing of termination Demonstration of different types of joints Practicing of different types of joints Demonstration of tagging Practicing of tagging Practicing of use of PPE	Practical-02 Hrs Total-03 Hrs	different wiring methods Insulation remover Electrician knife Pliers Thimble press Thimble of different sizes Cables of different sizes Cable jointing kit Different tags PPE's	

	Use personal protective equipment as per job requirement				
LU.4 Perform Wire Dressing	Trainee will be able to: Maintain distance between power, communication and control wires according to job requirements Perform alignment of cables as per job requirement	Definition of wire dressing Necessity of wire dressing Demonstration of aligning of cables Practicing of aligning of cables	Theory-00 Hrs Practical-02 Hrs Total-02 Hrs	Tool Box Different size cables PPE's	Class Room and workshop
LU.5 Perform Checking & Testing of electrical wiring	Trainee will be able to: Check continuity using line of terminal Perform test to identify open/close circuits Perform live test for verification of wiring Verify proper grounding / Panel Earthing (PE) on designated locations	Definition of testing Importance of testing Techniques of testing Demonstration of different wiring tests Practicing of different wiring tests Definition of grounding / earthing Techniques of grounding /earthing	Theory-01 Hrs Practical-01 Hrs Total-02 Hrs	Tool Box PPE's Megger Earth tester Test Lamp AVO Meter	Class Room and workshop

0732B&CE-049. Install electrical system

Objective: This competency standard covers the skills and knowledge required to Interpret Drawing, Arrange Resources for electrical wiring, Perform Wiring (Domestic & Industrial), termination and tagging, Perform Wire Dressing, and Perform Checking & Testing of electrical wiring.

Duration: 12 Hours Theory: 03 Hours Practice: 09 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU.1 Interpret Electrical layout	Trainee will be able to: Interpret layout of the job for installations Read/interpret electrical drawing for electrical wirings Follow drawing to connect components of equipment	Definition of layout Electrical symbols used in drawing Identification of electrical symbols Practicing	Theory-01 Hrs Practical-01 Hrs Total-02 Hrs	Layout drawing	Class Room and workshop
LU.2 Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation / dismantling	Trainee will be able to: Enlist and arrange tools and material as per job Arrange work permit for the wiring task Arrange backup resources for lighting, power and safety purposes as per job requirement	Preparation of list of material and tools as per job Preparation of work permit Arrangement of backup resources for light, power etc. Practicing	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Performa of work permit Sheet to record arrangement of backup resources PPE's	Class Room and workshop

LU.3 Perform Electrical Panel Installation	Trainee will be able to: Extract information from layout regarding panel installations Place the panel according to layout Connect input and output of cables in relevant panels as per electrical layouts	Necessity of electrical panel Types of electrical panels Technique of electrical panel installation Erection of electrical panel Practicing	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Layout drawing Electrical Panel Spirit level Measuring tape Tool Box PPE's	Class Room and workshop
LU.4 Perform Cable Installation	Trainee will be able to: Interpret layouts for cable route Handle cable for laying with the help of stacker Tag both ends of cables for cable tracing Lay cables in cable trays according to route plan Perform testing of cables e.g. insulation, continuity etc.	Definition of Cable route Technique of cable handling and laying Importance of tagging cable ends Definition of cable tracing Demonstration of cable insulation, continuity test Practicing of cable insulation, continuity test	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	Layout drawing Stacker Cable Tray Cables Megger Test Lamp AVO Meter PPE's	Class Room and workshop
LU.5 Perform Cable Dismantling	Trainee will be able to: Interpret layouts for cable route Disconnect electric supply from the job	Definition of cable dismantling Importance of disconnection of electric supply from the job	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	Layout drawing Tool Box Stacker	Class Room and workshop

	Handle cable for laying with the help of stacker Tag both ends of cables for cable tracing Remove cables in cable trays according to route plan	Technique of cable removing from cable trays Demonstration of cable removing from cable trays Practicing of cable removing from cable trays		Tags Test Lamp Megger AVO Meter Cables Tray PPE's	
LU.6 Perform Electrical Appliances Installation	Trainee will be able to: Interpret vendor's user manual for electrical installations Coordinate with concerned departments before installations for feedback Connect cables with machines as per operation manual Verify the connections with respect to color coding/tagging/numbering	Definition of vendor Importance of vendor user manual Importance of coordination with concerned department before installation Technique of cable connection with machine Importance of colour coding / tagging / numbering	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	Vendor Manual Machine Manual Tags Number Sleeves PPE's	Class Room and workshop
LU.7 Perform Electrical equipment Dismantling	Trainee will be able to: Extract information from layouts regarding electrical equipment dismantling Disconnect input / output cables of relevant equipment	Importance of extracting information from layout regarding electrical equipment dismantling Technique / process of dismantling electrical equipment	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Layout drawing Electrical equipment Machine Manual	Class Room and workshop

	Remove equipment from location as per SOPs Handle removed equipment as per manufacturers' instructions Place tags on dismantled items as per SOPs Store the dismantled equipment at designated place	Technique / process of storing dismantled equipment at designated place		Tags PPE's	
LU.8 Perform Earthing	Trainee will be able to: Perform earthing of cables according to calculated load Perform earthing of electrical appliances according to calculated load Perform earth resistance test as per standards	Parts of earthing Technique of earthing Importance of load calculation in earthing Demonstration of earthing of electrical appliance Demonstration of measurement of earth resistance Practicing	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Parts of Earthing Earth Tester Tool Box PPE's	Class Room and workshop
LU.9 Provide Power Supply to machine	Trainee will be able to: Interpret electrical drawings for power supply distribution Perform power distribution according to drawings	Importance of power distribution Importance of verification of electrical supply as per operation manual of equipment	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	Machine Manual PPE's Layout drawing	Class Room and workshop

	Perform verification of electrical supply as per operations manual Perform communication with all concerned persons for electrical appliance dry-run	Importance of communication with all concerned persons for electrical appliance dry run		Electrical equipment / machine	

0732B&CE-050. Construct Circuits

Objective: This competency standard covers the skills and knowledge required to construct parallel circuit, series circuit and tunnel circuit.

Duration: 08 Hours Theory: 02 Hours Practice: 06 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU.1 Construct parallel circuit for two lamps	Trainee will be able to: Observe OHS requirements Identify tools and equipment Draw diagram of parallel circuits for two lamps. Perform preliminary marking before termination of cables. Follow drawing to perform wiring and for reporting/ record purpose.	Definition of OHS Definition of parallel connection Drawing diagram of parallel circuit for two lamps Demonstration of connection Practicing of connection	Theory-1 Hrs Practical-2 Hrs Total-03 Hrs	Tool Box Layout drawing Lamp Holder Switch Cable Board Conduit PPE's	Class Room and workshop
LU.2 Construct series circuit for two lamps.	Trainee will be able to: Observe OHS requirements Identify tools and equipment Draw diagram of series circuits for two lamps. Perform preliminary marking before termination of cables. Follow drawing to perform wiring and for reporting/ record purpose.	Definition of series connection Drawing diagram of series circuit for two lamps Demonstration of connection Practicing of connection	Theory-0.5 Hrs Practical-2 Hrs Total-2.5 Hrs	Tool Box Layout drawing Lamp Holder Switch Cable Board Conduit PPE's	Class Room and workshop

LU.3 Construct tunnel circuit for multi storey building stair case.	Trainee will be able to: Observe OHS requirements Identify tools and equipment Draw diagram of tunnel circuit for multi storey staircase. Perform preliminary marking before termination of cables. Follow drawing to perform wiring and for reporting/ record purpose.	Definition of tunnel circuit Drawing diagram of tunnel circuit for four lamps Demonstration of connection Practicing of connection	Theory-0.5 Hrs Practical-2 Hrs Total-2.5 Hrs	Tool Box Layout drawing Lamp Holder Switch Cable Board Conduit PPE's	Class Room and workshop

0732B&CE-051. Measure Properties of Electricity

Objective: This competency standard covers the skills and knowledge required to measure voltage, current, find out resistance and power.

Duration: 08 Hours Theory: 02 Hours Practice: 06 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU.1 Measure voltage	Trainee will be able to: Identify tools and equipment Measure value of voltage according to specification Observe OHS requirement	Definition of voltage Importance of measurement of voltage Demonstration for measurement of voltage Practicing	Theory-1 Hrs Practical-2 Hrs Total-03 Hrs	Tool Box Layout drawing Voltmeter PPE's	Class Room and workshop
LU.2 Measure current	Trainee will be able to: Identify tools and equipment Measure value of current according to specification Observe OHS requirement	Definition of current Importance of measurement of current Demonstration for measurement of current Practicing	Theory-0.5 Hrs Practical-2Hrs Total-2.5 Hrs	Tool Box Layout drawing Ammeter PPE's	Class Room and workshop
LU.3 Find out resistance	Trainee will be able to: Record values of voltage and current Calculate resistance by ohm's law	Definition of resistance Definition of Ohm's law Calculation of resistance with Ohm's law Practicing	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Tool Box Layout drawing Voltmeter Ammeter PPE's	Class Room and workshop

LU.4 Find out power	Trainee will be able to: Record values of voltage and current Calculate power	Definition of power Calculation of power with values of voltage and current Practicing	Theory-0 Hrs Practical-1Hrs Total-01 Hrs	Tool Box Voltmeter Ammeter Wattmeter	Class Room and workshop

0732B&CE-052. Perform Electrical Wiring of a Single Room

Objective: This competency standard covers the skills and knowledge required to Interpret Drawing, Arrange Resources for electrical wiring, Perform Wiring (Domestic & Industrial), termination and tagging, Perform Wire Dressing, and Perform Checking & testing of electrical wiring.

Duration: 08 Hours Theory: 02 Hours Practice: 06 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU.1 Interpret Drawing	Trainee will be able to: Differentiate between control and power wiring as per job requirement Perform preliminary marking before termination of cables Follow drawing to perform wiring and for reporting/record purpose	Role of control wiring Role of power wiring Importance of preliminary marking before termination of cables Importance of following drawing to perform wiring	Theory-1 Hrs Practical-2 Hrs Total-03 Hrs	Layout control & power drawings	Class Room and workshop
LU.2 Arrange Resources for electrical wiring	Trainee will be able to: Enlist and arrange tools and material as per job Arrange work permit for the wiring task Arrange backup resources for lighting, power and safety purposes as per job requirement	Preparation of list of material and tools as per job Preparation of work permit Arrangement of backup resources for light, power etc. Practicing	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	Performa of work permit Sheet to record arrangement of backup resources	Class Room and workshop
LU.3 Perform Wiring (Domestic & Industrial),	Trainee will be able to: Perform Wiring using following methods: Concealed	Definition of Wiring methods: Concealed Conduit	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Charts / display boards	Class Room and workshop

termination and tagging	Conduit Bus way Open Duct Follow procedure to remove insulation and to attach thimbles Perform different types of terminations including High tension (HT) Low tension (LT) Control shrouding Sleeves Perform different types of joints High tension Low tension Water proof/underground Open Attach tags or numbers to wires for identification Use personal protective equipment as per job requirement	Bus way Open Duct Demonstration of insulation removing and thimble pressing Practicing of insulation removing and thimble pressing Demonstration of terminations Practicing of termination Demonstration of different types of joints Practicing of different types of joints Demonstration of tagging Practicing of tagging Practicing of use of PPE		showing different wiring methods Insulation remover Electrician knife Pliers Thimble press Thimble of different sizes Cables of different sizes Cable jointing kit Different tags PPE’s	

LU.4 Perform Wire Dressing	Trainee will be able to: Maintain distance between power, communication and control wires according to job requirements Perform alignment of cables as per job requirement	Importance of maintaining distance between power & communication cables Procedure of aligning cables Practice of aligning cables	Theory-0.5 Hrs Practical-1 Hrs Total-1.5 Hrs	Spirit Level Tool Box Thread PPE'S Cables	Class Room and workshop
LU.5 Perform Checking & Testing of electrical wiring	Trainee will be able to: Check continuity using line of terminal Perform test to identify open/close circuits Perform live test for verification of wiring Verify proper grounding / Panel Earthing (PE) on designated locations	Definition of continuity Definition of open & close circuit Test for identification of open or close circuit Practicing of open or close circuit test	Theory-0 Hrs Practical-1 Hrs Total-01 Hrs	PPE's Tool Box Test lamp AVO Meter Megger Earth Tester	Class Room and workshop

10. List of Tools, Equipment and Consumable

01: Basic Engineering Surveying

S#	Tools and Equipment	S#	Consumable Material
1	Ranging rods	1.	Lime
2	Steel Tape	2.	Drawing Sheets
3	Steel Band	3.	Lead Pencils
4	Invar tape	4.	Eraser
5	Metallic Tape		
6	Arrows		
7	Pegs		
8	Mallet		
9	Umbrella with stand		
10	Engineer’s chain		
11	Gunter’s chain		
12	Revenue Chain		
13	Metric chain		
14	Cross staff,		
15	line ranger,		
16	Optical square,		
17	Prismatic compass with stand.		
18	Telescopic Survey compass		
19	Telescopic Alidad		
20	Surveyor’s compass		
21	Plane table with all accessories		
22	Tilting Level with parallel plate micrometer (Precise level)		

23	Auto Level		
24	Laser Level		
25	Abney's Level		
26	Levelling Staff		
27	Digital planimeter		
28	Pentagraph		
29	Barometer		
30	Prism with Prism Pole		
31	Ball Pen Hammer		
32	Velocity Rods (Floats).		
33	Current Meter		
34	Sounding Rods		
35	Drawing Lab Instruments		
36	Target Staff		

02: Civil Engineering Drawing

S#	Tools and Equipment	S#	Consumable Material
1.	Drafting Table- Portable (Taper Type), Table size 32" x 24"	1.	Lead Pencils
2.	Instruments Box-Special Compass Set	2.	Eraser
3.	Tee Square (600 mm) Transparent	3.	Tracing Sheets
4.	Set Square- Transparent medium size (300 mm)	4.	Tracing Cloth
5.	Templates- Circle Square, Hexagon, Triangle (03 each)	5.	Drawing Sheets
6.	French Curves - Good Quality, medium size	6.	Graph paper
7.	Sharpener Machine	7.	Scotch Tape
8.	Drafting Machine Elbow type- Table size A o complete with all accessories	8.	Handkerchief

	03: Building Materials		
S#	**Tools and Equipment**	**S#**	**Consumable Material**
1	Brick Making Machine	1	Sand
2	Brick Molds	2	Sand Dust
3	Hand roller	3	cement
4	Thermometer	4	Lime
5	Umbrella with stand	5	Brick
6	PPEs	6	Stones
7	Calculator	7	Ferrous metal samples
8	Stone masonry instruments	8	Non-Ferrous metal samples
9	Scissor	9	Pencil,
10	Mason Trowel	10	Eraser,
11	Hammer	11	Sharpener,
12	Hammer Forged steel rectangle head	12	Drawing sheet,
13	Lump hammers		
14	Power Tools		
15	Hand Tools		

	04: Workshop Practice-I (Wood Work)		
S#	**Tools and Equipment**	**S#**	**Consumable Material**
1.	Ear Muff, Ear Plug	1.	Timber Deodar
2.	Safety shoes	2.	Timber Partal
3.	Gloves	3.	Nails
4.	Safety Goggles	4.	Screws
5.	Safety Helmet	5.	Gums
6.	Respiratory protective equipment i.e. Masks	6.	Polishes
7.	Life Jacket	7.	Lacquer

8.	High visibility jacket	8.	lac
9.	Safety harness	9.	paraffin and linseed oils
10.	Face shield	10.	methylated spirits
11.	Rubber shoes/ long shoes	11.	rubbers
12.	Compression testing machine	12.	Deodar Wood for Wooden Joints
13.	Digital weighing balance	13.	Fire Fighting Safety Equipment (Fire Extinguishers and Safety Care, etc.)
14.	Laboratory oven	14.	Glue 5 Kg
15.	Files	15.	Kail Wood for Door & Frame
16.	Diamond stones	16.	Kerosene Oil
17.	Water stones	17.	Lubricating Oil / Grease
18.	Oil stones	18.	Nails
19.	Ceramic stones	19.	Overall / Apron for Trainees
20.	Wood tool	20.	Safety Shoes for Trainees
21.	Measuring tool	21.	Screw ¾“, 1”, 1½ “, 2” (2 Packets each)
22.	Marking tools	22.	Sheshum Wood
23.	Holding tool	23.	Veneer Board (4" x 8’ x ¾”)
24.	Cutting tool		
25.	Planning tool		
26.	Fastening tools		
27.	Boring machine		
28.	Fastenings		
29.	Sprayer		
30.	Circular SAW		
31.	W.W, Planer		
32.	Wood Turning lathe		
33.	Spindle		
34.	Boring machine		
35.	Sander		

	05: Workshop Practice-II (Electrical Wiring)		
S#	**Tools and Equipment**	**S#**	**Consumable Material**
1.	Ear Muff, Ear Plug	1.	Cable 3/0.029, 7/0.029, 7/0.036, flexible,
2.	Safety shoes	2.	single core, double core each
3.	Gloves	3.	Fire Fighting Safety Equipment (Fire Extinguishers and Safety Care, etc.)
4.	Safety Goggles	4.	Wiring accessories (switch,
5.	Safety Helmet	5.	sockets,
6.	Respiratory protective equipment i.e. Masks	6.	boards of sizes,
7.	Life Jacket	7.	bulb holders,
8.	High visibility jacket	8.	dimmer,
9.	Safety harness	9.	Ceiling rose,
10.	Face shield	10.	indicators,
11.	Rubber shoes/ long shoes	11.	breakers,
12.	Electrical drawing	12.	main switches,
13.	Computer	13.	two way switch,
14.	Emergency light	14.	change overs,
15.	Ladder	15.	regulators,
16.	drill machine tool kit	16.	cleats,
17.	Thimble puncher	17.	clips,
18.	Shroud	18.	insulation tape,
19.	PVC tape	19.	screws of sizes,
20.	HT tape	20.	steel nails etc
21.	Thimbles	21.	pipes,
22.	cable knife	22.	casing and capping,
23.	wire stripper	23.	batten each

24.	drill machine	24.	bulbs,
25.	PPE	25.	tube lights,
26.	Cable tie	26.	energy savers,
27.	Clamps	27.	Circuit Breakers
28.	Plier	28.	Electric Ballasts (40 W)
29.	Cutter	29.	Panel Board
30.	spiral/ flexible pipes	30.	Earthing system materials
31.	tie base		
32.	ravel bolt		
33.	ravel plug		
34.	hilty bolt		
35.	wooden screw		
36.	AVO meter		
37.	test lamp		
38.	earth tester		
39.	line tester		
40.	megger		
41.	Voltmeter		
42.	Ammeter		
43.	Multi meter		
44.	Ohmmeter		
45.	Drawings, operations manuals		
46.	Layouts, ICT, measuring tools (calipers, cable chart, hand hacksaw, measuring tape, laser gun for length), quality standards, vendor certificate, grinding cutter, drill machines, hammer		
47.	Layouts, lifters, chain-pulley, jacks, sprit level		
48.	Layouts, measuring tools, cutting tools like wire cutter, side cutter, cable cutter, thimble presser, megger, stacker, tags, glands, shrouds, conduits, cable tray etc		

49.	Layouts, cutting tools e.g. wire cutter, side cutter, cable cutter, stacker, tags etc.		
50.	Drawing, layout, manual, fork lifter, drill machine,		
51.	Layouts, lifters, chain-pulley, jacks, tags		
52.	Soldering, earth tester, thimble presser,		
53.	Drawings, multi meters,		
54.	Wiring Boards 3’ x 5’ Wall Mounted		
55.	Wood Chisel 1”		
56.	Work Benches 4’ x 6’ x 2.5’		
57.	Single-Phase Electric Motors		
58.	Single–Phase Energy Meter		
59.	Air Conditioners		
60.	3-Phase Electric Motors		
61.	3-Phase Energy Meter		
62.	AVO Meters		
63.	Clamp on Meter		
64.	Cold Chisels 10” Long		
65.	Combination Pliers 8”		
66.	Electric Bells		
67.	Fluorescent Tubes (with electric choke)		
68.	Hack Saws 15”		
69.	Hand-Drill Machine Electric Two Speeds 3/4” Chuck Heavy Duty		
70	Kerosene Burners		

11. Members of Curriculum Development Committee

The following members participated in the Curriculum development Committee:

S#	Name	Designation	Organization
1	Engr. Azhar Iqbal Shad	Chief Instructor (Civil)	GCT Raiwnd Road, LHR
2	Mr. Imtiaz Ahmed Awan	Sr. Instructor (Civil)	GCT Rasul (Mandi Bahauddin)
3	Mr. Muhammad Amjad Rafique	Sr. Instructor (Civil)	GCT Rasul (Mandi Bahauddin)
4	Engr. Zuneera Ashfaq	Assistant Director	PITAC Lahore
5	Engr. Mohsin Jahanzeb	Instructor (Civil)	GSTC, Faisalabad
6	Engr. Norheen Amina	Consultant	Allied Engineering Services Lahore
7	Engr. Hira Ishtiaq	Consultant.	Allied Engineering Services Lahore
8	Engr. Habiba Mohsin	Design Engineer	JERS Engineering Consultants Lahore
9	Engr. Rana Haroon Mujahid	Deputy Director	C&W Department Govt. of Punjab
10	Engr. Arsalan Hameed Khan	Assistant Manager (Project)	Planning & Project department Lahore Waste Management Company.
11	Mr. Syed Fayyaz Mustafa Naqvi	Junior Instructor	GSTC Faisalabad
12	Engr. Inayat-ur-Rehman	DACUM, Facilitator	Peshawar
13	Mr. Muhammad Ishaq	Director HR	NAVTTC, Islamabad