

OPERATOR COAL HANDLING EQUIPMENTS

COMPETENCY BASED CURRICULUM

(Duration: 1 Year 3 Months)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 4



SECTOR – PRODUCTION & MANUFACTURING



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

OPERATOR COAL HANDLING EQUIPMENTS



NSQF LEVEL - 4

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Developed By

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1. BACKGROUND

1.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate (ITI pass-outs) issued by National Council for Vocational Training (NCVT) to develop skilled manpower for the industry. There are four categories of apprentices namely; **trade apprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

1.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly.



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2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training.

Operator Coal Handling Equipment trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of one year three months (01 Block of 15 months duration including basic training) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by NCVT having worldwide recognition.

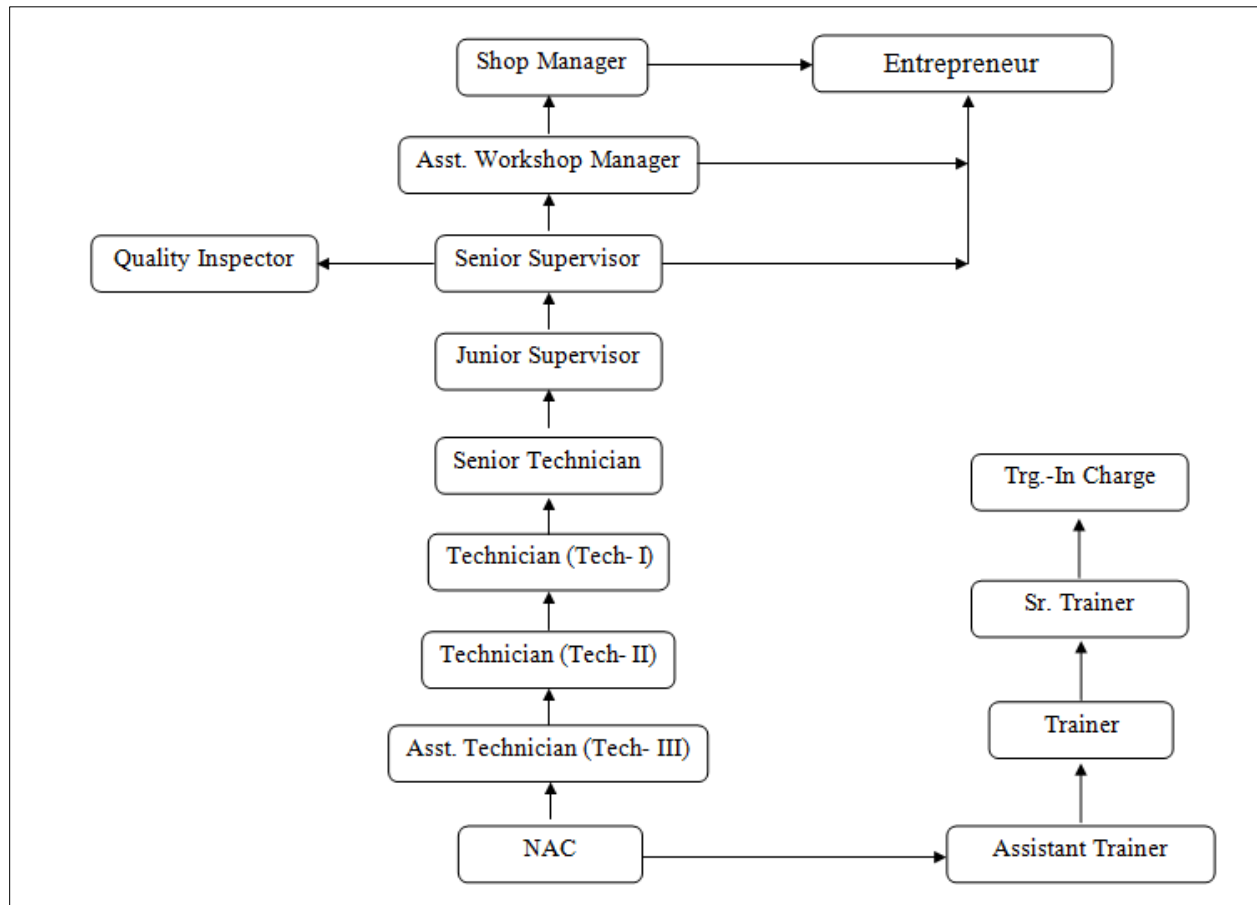
Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

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2.2 CAREER PROGRESSION PATHWAYS:

- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of one year (*Basic Training and On-Job Training*) : -

Total training duration details: -

Time (in months)	1-3	4 - 15
Basic Training	Block– I	-----
Practical Training (On - job training)	----	Block – I

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A. Basic Training

For 02 yrs. course (Engg.) :-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)

For 01 yr. course (Engg.) :-(**Total 03 months:** 03 months in 1st yr.)

S No.	Course Element	Total Notional Training Hours	
		For 02 Yrs. course	For 01 Yr. course
1.	Professional Skill (Trade Practical)	550	275
2.	Professional Knowledge (Trade Theory)	240	120
3.	Workshop Calculation & Science	40	20
4.	Engineering Drawing	60	30
5.	Employability Skills	110	55
	Total (Including internal assessment)	1000	500

B. On-Job Training:-

For 02 yrs. Course (Engg.) :-(**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. course (Engg.) :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course (Engg.)	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. course (Engg.)	500 hrs.	2080 hrs.	2580 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt of India from time to time. The Employability skills will be tested in first two semesters only.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

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b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NAC will be conducted by NCVT on completion of course as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.**

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration should be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate with occasional guidance and showing due regard for safety procedures	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment

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and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	- Below 70% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. - A fairly good level of neatness and consistency in the finish - Occasional support in completing the project/job.
(b) Weightage in the range of above 75% - 90% to be allotted during assessment	
For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.	- Good skill levels in the use of hand tools, machine tools and workshop equipment 70-80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. - A good level of neatness and consistency in the finish - Little support in completing the project/job
(c) Weightage in the range of above 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	- High skill levels in the use of hand tools, machine tools and workshop equipment - Above 80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. - A high level of neatness and consistency in the finish. - Minimal or no support in completing the project.

Brief description of Job roles:

Washing Plant Operator, Coal operates different machines and equipment for sizing, cleaning, washing and preparing coal for sale or further processing. Checks operating condition of plant, machines and equipment, such as conveyor, crusher, agitator, elevator, wash box, blower, pump, feeder screen, core and refuse gate. Sets and adjusts them as necessary to have desired pulsation, correct performance, proper control of air, water and coal, etc. by observing readings on different meters and gauges and by regulating values on control panel. Adjusts flow of raw coal through them to separate slate rock and other impurities. Operates cone to mix sand and water in proper proportions to ensure correct specific gravity and observes operation. Tests sample of processed coal by weighing and simple physical and chemical tests to ensure correct percentage of ash content, and minimum rejection of usable coal. May conduct repair of machinery. May perform only a portion of above duties and be designated as RAW COAL SECTION OPERATOR, FEED OPERATOR, CONE OPERATOR, REFUSE, GATE OPERATOR, etc. according to operation performed or machine handled.

Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

Reference NCO 2015: 8112.9900 - Mineral and Stone Processing Plant Operators, Other

4. NSQF LEVEL COMPLIANCE

NSQF level for Operator Coal Handling Equipment trade under ATS: **Level 4**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

- a. Process
- b. professional knowledge,
- c. professional skill,
- d. core skill and
- e. Responsibility.



The Broad Learning outcome of Operator Coal Handling Plant trade under ATS mostly matches with the Level descriptor at Level- 4.

The NSQF level-4 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 4	Work in familiar, predictable, routine, situation of clear choice.	Factual knowledge of field of knowledge or study	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	Language to communicate written or oral, with required clarity, skill to basic Arithmetic and algebraic principles, basic understanding of social political and natural environment.	Responsibility for own work and learning.

5. GENERAL INFORMATION

Name of the Trade	Operator Coal Handling Equipments
NCO - 2015	8112.9900
NSQF Level	Level – 4
Duration of Apprenticeship Training (Basic Training + On-Job Training)	3 months + One year (01 Block of 15 months duration including basic training).
Duration of Basic Training	a) Block –I : 3 months Total duration of Basic Training: 3 months
Duration of On-Job Training	a) Block–I: 12 months Total duration of Practical Training: 12 months
Entry Qualification	Passed 10 th Class with Science and Mathematics under 10+2 system of Education or its equivalent
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by NCVT.
Rebate to Ex-ITI Trainees	03 months
CTS trades eligible for Operator Coal Handling Equipments Apprenticeship	Stone Mining Machine Operator

Note:

- Industry may impart training as per above time schedule for different block, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspects is compromised.
- For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to NCVT.

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the Operator Coal Handling Equipment course of 01 years duration under ATS.

Block I:-

1. Recognize & comply safe working practices, environment regulation and housekeeping.
2. Understand and explain different mathematical calculation & science in the field of study including basic electrical. *[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]*
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]*
4. Select and ascertain measuring instrument and measure dimension of components and record data.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.
6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
8. Plan and organize the work related to the occupation.

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Safety and best practices/Basic Industrial Culture (5S, KAIZEN, etc.)
2. Prepare different types of documentation as per industrial need by different methods of recording information.
3. **Unloading of Coal Wagons by Tippler** :Familiarization with different parts of Wagon tippler, dos and don'ts, Pre-start checks, shift take over, feed belt / conveyor operation,

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- chute cleaning, post job checks, housekeeping, adherence to Standard Operating Procedures (SOPs)
4. Familiarization with different parts of Wagon Chargers, dos and don'ts, Pre-start checks, shift take over, operation of wagon charger & feed belts, post job checks, housekeeping.
 5. Stopping & starting of drives, check points, Emergency stoppage, and power failure.
 6. Identification & utility of limit switches of Tipplers, Side Arm Chargers, Beetles, Chute Jam Sensors, pull chords.
 7. **Stacking and averaging of Coal by Stacker Operation:** Familiarization with different parts of Stackers, dos and don'ts, Pre-start checks, shift take over.
 8. Post job checks, Control Desk Operation, chute cleaning, housekeeping, adhere to SOP.
 9. Stopping & starting of drives, check points, Emergency stoppage, and power failure.
 10. Stacker operation in monsoon.
 11. Identification & utility of limit and safety switches of stackers and conveyors, inspection of trolley wire, Power Collectors, reeling drums & belt joints.
 12. **Retrieving of stacked coal by Reclaimer:** Familiarization with different parts of Reclaimers, dos and don'ts, Pre-start checks, shift take over.
 13. Post job checks, Control Desk Operation, housekeeping, adhere to SOP.
 14. Stopping & starting of drives, check points, Emergency stoppage, and power failure and spillage control.
 15. Reclaimer operation in monsoon.
 16. Identification & utility of limit and safety switches of Reclaimer and conveyors, inspection of trolley wire, Power Collectors, reeling drums & belt joints.
 17. **Crushing of Coal by Selective Crushing Unit Operation:** Familiarization with different parts of Hammer Crusher, dos and don'ts, Pre-start checks, shift take over, feed conveyor operation, chute cleaning, post job checks, housekeeping, adherence to SOP, adjustment of Grate Bar assembly & Breaker plate of crusher.
 18. Familiarization with different parts of Pneumatic Classifiers, Weigh Feeders, Dos and Don'ts, Pre-start Checks, shift take over, sequential starts of equipments, post job checks, housekeeping. Eye estimation of coal crushing. Water addition to coal blend.
 19. Stopping & Starting of drives, Emergency stoppage and power failure.
 20. Identification & utility of limit switches.
 21. **Operation of Conveyors:** Shift take-over
 22. Pre-start checks
 - i. Running checks : Feed adjustments
 - ii. Tracking of conveyors
 - iii. Spillage prevention
 23. Shutdown preparations
 24. Equipment safety & daily check list
 25. Stoppage on emergency / power failure

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26. House-keeping
27. **Fire fighting system & pump operation:** Familiarization with different parts of Centrifugal Pump, Dos and Don'ts, Pre-Start Checks, Post Job checks.
28. Familiarization with different types of Fire Extinguishers & parts of fire fighting network, Dos and Don'ts, Mock Drills.

Note: *Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.*



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7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1. 1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1. 2. Recognize and report all unsafe situations according to site policy.
	1. 3. Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1. 4. Identify, handle and store / dispose off dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1. 5. Identify and observe site policies and procedures in regard to illness or accident.
	1. 6. Identify safety alarms accurately.
	1. 7. Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1. 8. Identify and observe site evacuation procedures according to site policy.
	1. 9. Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1. 10. Identify basic first aid and use them under different circumstances.
	1. 11. Identify different fire extinguisher and use the same as per requirement.
	1. 12. Identify environmental pollution & contribute to avoidance of same.
	1. 13. Take opportunities to use energy and materials in an environmentally friendly manner
	1. 14. Avoid waste and dispose waste as per procedure
	1. 15. Recognize different components of 5S and apply the same in the working environment.
2. Understand, explain different mathematical calculation & science in the field of study including basic	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.

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electrical and apply in day to day work.[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation & earthing.
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. [Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]	3. 1. Read & interpret the information on drawings and apply in executing practical work.
	3. 2. Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	3. 3. Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. Select and ascertain measuring instrument and measure dimension of components and record data.	4.1 Select appropriate measuring instruments such as micrometers, vernier calipers, dial gauge, bevel protector and height gauge (as per tool list).
	4.2 Ascertain the functionality & correctness of the instrument.
	4.3 Measure dimension of the components & record data to analyse the with given drawing/measurement.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts

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6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution. 6.2 Dispose waste following standard procedure.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	7. 1. Explain personnel finance and entrepreneurship. 7. 2. Explain role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme. 7. 3. Prepare Project report to become an entrepreneur for submission to financial institutions.
8. Plan and organize the work related to the occupation.	8. 1. Use documents, drawings and recognize hazards in the work site. 8. 2. Plan workplace/ assembly location with due consideration to operational stipulation 8. 3. Communicate effectively with others and plan project tasks 8. 4. Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.
SPECIFIC OUTCOME	
Block-I	
<i>Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under Block – I(section: 10) must ensure that the trainee works in familiar, predictable, routine, situation of clear choice. Assessment criteria should broadly cover the aspect of Planning (Identify, ascertain, etc.); Execution apply factual knowledge of field of knowledge, recall and demonstrate practical skill during performing the work in routine and repetitive in narrow range of application, using appropriate rule and tool, complying with basic arithmetic and algebraic principles and language to communicate in written or oral with required clarity; Checking/ Testing to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for his/her own work and learning.</i>	

BASIC TRAINING (Block – I)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1.	Safety: - its importance, classification, personal, general, workshop and job safety. Occupational health and safety. Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Importance of housekeeping & good shop floor practices. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Fire& safety: Use of Fire extinguishers. Safety regarding working with different types of steam and its First-Aid. Drill on fire fighting & safety	Safety Precautions to be followed at site. Fire precautions causes and types of fire, precaution against outbreak of fire. Fire extinguisher types and uses. Proper centering erection, proper scaffolding making & precautions to be taken while working at higher attitudes and during hot repair. Precautions to be followed in Gas hazardous area. Precaution during dismantling.
2 - 3	a. Preparation of major equipment list b. Dos and don'ts c. Utility & potential of major equipments d. Material flow diagram for CHP e. Safety precaution during handling of coal & use of PPEs. f. Cost of different types of coal & wastage control.	a. Coke making process, Cost & sensitivity analysis, Pollution control equipments & norms b. Familiarization with different equipment of Coal Handling Plant(CHP) c. General safety d. All safety devices in CHP. e. Function of different equipment in CHP f. Study of material flow diagram of CHP g. Safety in material handling h. Financial impact of coal on steel making,

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		Concept of Demurrage i. Concept of Blending and Averaging j. Monsoon Preparations
4.	Video demo of the Operation of Wagon Tippler process.	a. Operation of Wagon Tippler i) Technical data (Specification) ii) Types of Wagon Tipplers iii) Safety to man & machines iv) Importance of load setting b. Operation of Wagon Chargers i) Technical data ii) Types of Wagon Chargers iii) Safety to man & machines iv) Importance of smooth running of wagon Chargers
5	Practice on Drives of Tipplers, side arm charger, beetle chargers and feed belts.(Involving different switches & safety devices)	c. Introduction to Drives of Tipplers, Side Arm Charger, Beetle Chargers & Feed Belts d. Introduction to function of different limit switches & other safety devices e. Log Book entry
6	Video demo of the Operation of Stackers process.	Operation of Stackers i) Technical data ii) Quality Parameters iii) Types of Stackers iv) Safety to man & machines while operating Stackers v) Importance of averaging vi) Factor affecting averaging vii) Functions of different limit and safety switches. viii) Introduction to Material Conveying system. ix) Log book entry
7	Video demo of the Operation of Reclaimer process.	Operation of Reclaimer i) Technical data ii) Types of Reclaimers iii) Safety to man & machines during equipment operation. iv) Importance of proper loading of conveyor & spillage control. v) Importance of adherence to SOP vi) Functions of different limit switches, safety switches & drives vii) Introduction to Material Conveying

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		system. viii) Log book entry
8	Practice on Hammer crushers.(Involving different types of crusher, hammer, machines etc.)	a. Operation of Hammer Crusher i) Technical data ii) Types of Crushers iii) Types of Hammers iv) Safety to man & machines while operating Crushers. v) Milling indices & desired Crushing
9	Video demo of blending of coal & operation of pneumatic classifiers process.	b. Importance of Blending of coal & Operation of Pneumatic Classifiers i) Technical data ii) Parts of Pneumatic Classifiers iii) Quality of input coal and its blending iv) Quality of blended coal v)Parameters of Classifier iv) Safety to man & machines in case of classifiers Operations c. Introduction to Drives of Crushers, Classifiers, Conveyors, quality control system d. Log book entry
10	Video demo of related process. Practice on Conveying system.(Involving different types of conveying)	a. Introduction to Conveying Systems i. Types of conveyors ii. Design features iii. Weigh Feeders b. Drives of conveyors c. Transfer of material from one conveyor to another d. General layout of conveyors e. Various parts of a conveyor f. Conveyor related safety aspects g. Monsoon Hazards & Preparations h. General safety
11-12	Video demo of self-combustion process. Video demo of safety devices in conveyor system (flow accidents can happen) Video demo of belt joints (cold patching, hot vulcanizing & mechanical fastening.)	a. Concept of Self-combustion b. Operation of Fire Pump i) Technical data ii) Types of Pumps & Fire Extinguishers iii) Parts of Pump attachments iv) Loading of Centrifugal Pump c. Introduction to fire fighting network i) Technical data ii) Types fittings in fire fighting network. iii) Safety to man, machines and

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	Basic of screens & feeders (operation & maintenance) V-belt adjustment & tension checking.	importance of fire fighting system. iv) Fire Extinguisher Operation & Valve operation. v) Log book entry
13	Revision& Internal Assessment	

Note: - More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.



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9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	Workshop Calculation and Science (Duration: - 20 hrs.)	Engineering Drawing (Duration: - 30 hrs.)
1.	Applied workshop problems involving simple addition, subtraction, multiplication, division and common fractions	Introduction to Engineering drawing, its importance and uses in engineering fields. Simple definitions of Points, Lines, Parallel straight lines.
2.	Science- Definition, Nomenclature, various branches, significance and definitions of important terms.	Geometrical construction of Square, Rectangle, Triangle, Circle, Polygons, etc.,
3.	Rounding of decimal values, use of approximation.	Drawing different types of lines.
4.	Units – Definition, fundamental & derived units, system of units- FPS, CGS, MKS and SI units of some important parameters- Length , mass, time, density, current, voltage, pressure etc. Unit conversion.	Free hand sketch of Hand tools used in the trade.
5.	Workshop problems related to average.	Screw Threads – Forms of Various Screw threads used in general in the industry – Nomenclature, convention
6.	Workshop problems related to percentage.	Fastening Devices – Temporary and Permanent. Meaning and difference. Temporary Device – Hexagonal Bolt, Nut, Check Nut, Washer.
7.	Workshop problems related to ratio and proportion.	Different Methods of Preventions of rotation of Bolts - Check nut, Square headed bolt, Square headed bolt with square neck, cup headed bolt, Eye bolt, counter sunk headed bolt, rag bolt, etc.
8.	Workshop problems related on time & work.	Different Methods of locking of nuts :- a) Lock nuts, b) Split pin, c) Slotted nut, d) Symonds nut, e) Castle nut, f) Wings nut, etc.

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9.	Profit & Loss and problems concerning to workshop practices.	Permanent Fastening Devices- Rivets – different parts and their types Different types of rivet heads.
10.	Properties of Matter- Different types of Properties of Matter e.g. Mechanical, Electrical, Chemical, Magnetic.	Rivets Joints – Lap joint and Butt or Strap joint. Lap Joint – a) Single Riveted, b) Double riveted, i) Chain, ii) zig – zag Butt Joint – a) Single plate or strap, b) Double plate or strap
11.	Properties of Matter (Mechanical) - Tenacity, Toughness, Malleability, Ductility, Elasticity, Plasticity, Brittleness, Hardness (concept & definition)	Keys and Cotter Joints, Difference between Keys and Cotters, Different types of Keys.
12.	Properties and uses of copper, zinc, lead, tin, aluminum, brass, bronze, solder, bearing metals, timber, and rubber.	---
13.	Engineering Material- Introduction, classification, Metallic- Non metallic material, physical and mechanical properties,	---
14.	Heat & temperature- Definition and its importance. Scales of Temperature, e.g. Fahrenheit, Centigrade, Kelvin-relationship between them.	---
15.	Transmission of heat- Conduction, Convection and Radiation. Examples from Industries (concept & definition)	---
16.	Transmission of Power and motion of Belt and Pulleys:- Driver and Follower – Open and Cross belt system of belt drives. Velocity ratio. Power Transmission by belt – Problems	---

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9.2 EMPLOYABILITY SKILLS

(DURATION: - 55 HRS.)

Topic No.	Topic	Duration (in hours)
	English Literacy	7
1.	Reading Reading and understanding simple sentences about self, work and environment	
2.	Writing Construction of simple sentences Writing simple English	
3.	Speaking / Spoken English Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Taking messages, passing messages on and filling in message forms, greeting and introductions office hospitality, resumes or curriculum vitae essential parts, letters of application reference to previous communication.	
	I.T. Literacy	10
1.	Basics of Computer Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
2.	Word processing and Worksheet Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets. Use of External memory like pen drive, CD, DVD etc,	
3.	Computer Networking and INTERNET Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication.	
	Communication Skill	18
1	Introduction to Communication Skills Communication and its importance Principles of Effective communication Types of communication - verbal, nonverbal, written, email, talking on phone. Nonverbal communication - components-Para-language	

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	Body - language Barriers to communication and dealing with barriers.	
2	Listening Skills Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.	
3	Motivational Training Characteristics Essential to Achieving Success The Power of Positive Attitude Self awareness Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.	
4	Facing Interviews Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview	
	Entrepreneurship skill	8
1.	Concept of Entrepreneurship Entrepreneurship- Entrepreneurship - Enterprises:-Conceptual issue. Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.	
2.	Institutions Support Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes& procedure & the available scheme.	
	Productivity	
1.	Productivity Definition, Necessity.	
2.	Affecting Factors Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3.	Personal Finance Management Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	6
1	Safety & Health Introduction to Occupational Safety and Health importance of safety and health at workplace.	
2	Occupational Hazards Basic Hazards, Chemical Hazards, Vibro-acoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health,	

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	Occupational hygienic, Occupational Diseases/ Disorders & its prevention.	
3	Accident & safety Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.	
4	First Aid Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person	
	Labour Welfare Legislation	
1	Welfare Acts Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Employees Provident Fund Act.	
	Quality Tools	6
1.	Quality Consciousness : Meaning of quality, Quality Characteristic	
2.	Quality Circles : Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.	
3.	House Keeping : Purpose of Housekeeping, Practice of good Housekeeping.	
4.	Quality Tools Basic quality tools with a few examples	

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10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below: -

Block – I

1. Safety and best practices/Basic Industrial Culture (5S, KAIZEN, etc.)
2. Prepare different types of documentation as per industrial need by different methods of recording information.
3. **Unloading of Coal Wagons by Tippler** :Familiarization with different parts of Wagon tippler, dos and don'ts, Pre-start checks, shift take over, feed belt / conveyor operation, chute cleaning, post job checks, housekeeping, adherence to Standard Operating Procedures (SOPs)
4. Familiarization with different parts of Wagon Chargers, dos and don'ts, Pre-start checks, shift take over, operation of wagon charger & feed belts, post job checks, housekeeping.
5. Stopping & starting of drives, check points, Emergency stoppage, and power failure.
6. Identification & utility of limit switches of Tipplers, Side Arm Chargers, Beetles, Chute Jam Sensors, pull chords.
7. **Stacking and averaging of Coal by Stacker Operation**: Familiarization with different parts of Stackers, dos and don'ts, Pre-start checks, shift take over.
8. Post job checks, Control Desk Operation, chute cleaning, housekeeping, adhere to SOP.
9. Stopping & starting of drives, check points, Emergency stoppage, and power failure.
10. Stacker operation in monsoon.
11. Identification & utility of limit and safety switches of stackers and conveyors, inspection of trolley wire, Power Collectors, reeling drums & belt joints.
12. **Retrieving of stacked coal by Reclaimer**: Familiarization with different parts of Reclaimers, dos and don'ts, Pre-start checks, shift take over.
13. Post job checks, Control Desk Operation, housekeeping, adhere to SOP.
14. Stopping & starting of drives, check points, Emergency stoppage, and power failure and spillage control.
15. Reclaimer operation in monsoon.
16. Identification & utility of limit and safety switches of Reclaimer and conveyors, inspection of trolley wire, Power Collectors, reeling drums & belt joints.
17. **Crushing of Coal by Selective Crushing Unit Operation**: Familiarization with different parts of Hammer Crusher, dos and don'ts, Pre-start checks, shift take over, feed conveyor operation, chute cleaning, post job checks, housekeeping, adherence to SOP, adjustment of Grate Bar assembly & Breaker plate of crusher.

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18. Familiarization with different parts of Pneumatic Classifiers, Weigh Feeders, Dos and Don'ts, Pre-start Checks, shift take over, sequential starts of equipments, post job checks, housekeeping. Eye estimation of coal crushing. Water addition to coal blend.
19. Stopping & Starting of drives, Emergency stoppage and power failure.
20. Identification & utility of limit switches.
21. **Operation of Conveyors:** Shift take-over
22. Pre-start checks
 - iv. Running checks : Feed adjustments
 - v. Tracking of conveyors
 - vi. Spillage prevention
23. Shutdown preparations
24. Equipment safety & daily check list
25. Stoppage on emergency / power failure
26. House-keeping
27. **Fire fighting system & pump operation:** Familiarization with different parts of Centrifugal Pump, Dos and Don'ts, Pre-Start Checks, Post Job checks.
28. Familiarization with different types of Fire Extinguishers & parts of fire fighting network, Dos and Don'ts, Mock Drills.

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.
2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

OPERATOR COAL HANDLING EQUIPMENTS			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)			
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)			
Sl. no.	Name of the Tool & Equipments	Specification	Quantity

B : INSTRUMENTS & GENERAL SHOP OUTFIT			

F. LIST OF ADDITIONAL TOOLS FOR ALLIED TRADE IN WELDING			

G. LIST OF TOOLS & ACCESSORIES FOR PNEUMATICS AND HYDRULICS			

As per training need the tools & equipments may be procured.

Operator Coal Handling Equipments

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: OPERATOR Coal Handling Equipment

LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

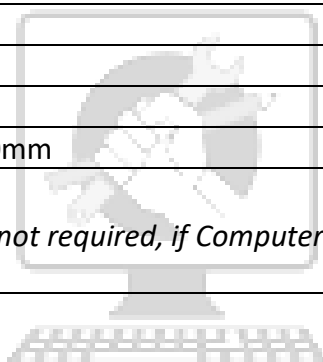
1) **Space Norms** : 45 Sq. m.(For Engineering Drawing)

2) **Infrastructure:**

A : TRAINEES TOOL KIT:-			
Sl. No.	Name of the items	Specification	Quantity
1.	Draughtsman drawing instrument box		20+1 set
2.	Set square celluloid 45° (250 X 1.5 mm)		20+1 set
3.	Set square celluloid 30°-60° (250 X 1.5 mm)		20+1 set
4.	Mini drafter		20+1 set
5.	Drawing board (700mm x500 mm) IS: 1444		20+1 set
B : Furniture Required			
Sl. No.	Name of the items	Specification	Quantity
1	Drawing Board		20
2	Models : Solid & cut section		as required
3	Drawing Table for trainees		as required
4	Stool for trainees		as required
5	Cupboard (big)		01
6	White Board (size: 8ft. x 4ft.)		01
7	Trainer's Table		01
8	Trainer's Chair		01

Operator Coal Handling Equipments

TOOLS & EQUIPMENTS FOR EMPLOYABILITY SKILLS		
Sl. No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software.	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
<i>Note: - Above Tools & Equipments not required, if Computer LAB is available in the institute.</i>		



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FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :						Year of Enrollment :							
Name & Address of ITI (Govt./Pvt.) :						Date of Assessment :							
Name & Address of the Industry :						Assessment location: Industry / ITI							
Trade Name :			Semester:			Duration of the Trade/course:							
Learning Outcome:													
Sl. No	Maximum Marks (Total 100 Marks)	15	5	10	5	10	10	5	10	15	15	Total internal assessment Marks	Result (Y/N)
	Candidate Name	Father's/Mother's Name	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA	
1													
2													