

MATE (MINES)

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5



SECTOR – MINING AND MINERALS



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

MATE (MINES)

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)



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Developed By

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Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

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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.

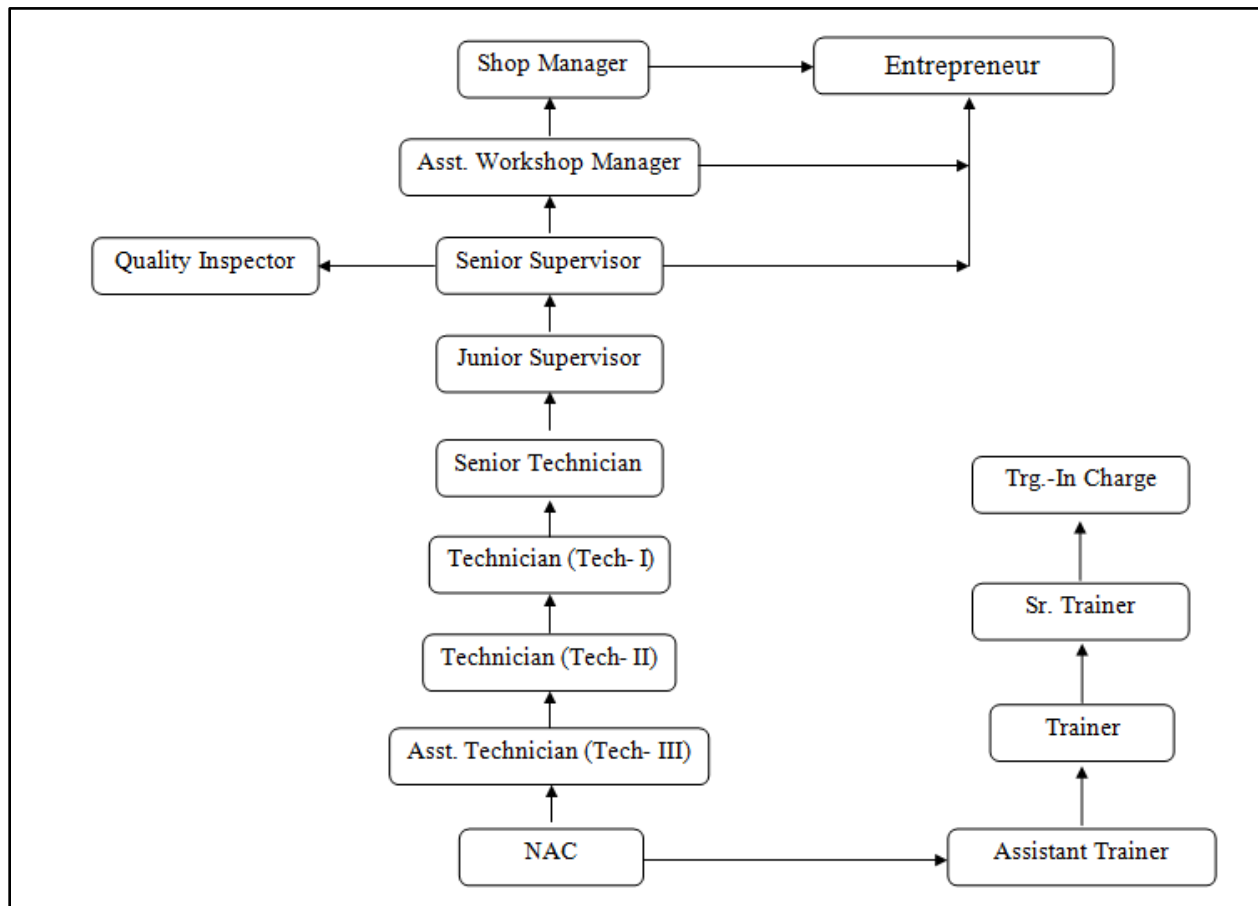
Mate (Mines) trade under ATS is one of the most popular courses delivered nationwide through Electricity Boards. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while 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.
- Document the technical parameters related to the task undertaken.

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 two years (*Basic Training and On-Job Training*): -

Total training duration details: -

Time (in months)	1-3	4-12	13-15	16-24
Basic Training	Block – I	-----	Block – II	-----
Practical Training (On - job training)	----	Block – I	-----	Block – II

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A. Basic Training

For 02 yrs. Course (Engg) :-(**Total 06 months:** 03 months in 1styr. + 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 1styr. + 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.

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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 (section-2.4.2). The marks of internal assessment will be as per the template (Annexure – II).

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 (section-2.4.2) 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 OSH 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:

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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 and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment • 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 above75% - 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:

Overman, Colliery; Mine Foreman guides and supervises extraction of coal, mineral, timbering, etc. in his section of mine and ensures compliance of safety measures. Supervises setting of supports for securing roof and walls of work face. Ensures that air crossing, door, brattice and other ventilation devices are maintained in good order. Inspects track and tram-lines to see that they are properly laid, graded ballasted or otherwise packed. Ensures that man-holes and haulage roadways are kept safe and clear of obstruction. Detects unsafe appliances such as runaway switches, stop-blocks, ropes, chains, brakes, jig-wheels and gets them replaced. Ensures that supply of timber, brattice and other essential materials are stored at convenient places. Attends to danger reports and employs safety measures promptly. Gets dangerous places adequately fenced-off and gets defects removed. Maintains prescribed records and submits reports to superiors on safety measures and output of work. May do gas testing and supervise rescue operations if necessary. May be designated as RESCUE OVERMAN if qualified and perform rescue operations.

Plan and organize assigned work and detect & resolve issues during execution. Demonstrate possible solutions and agree tasks within the team. Communicate with required clarity and understand technical English. Sensitive to environment, self-learning and productivity.

Reference NCO & NOS: 3121.0400 – Overman, Colliery

NSQF level for Mate (Mines) trade under ATS: **Level 5**

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 Mate (Mines) under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	MATE (MINES)
NCO-2015	3121.0400
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years (02 Blocks each of one year duration).
Duration of Basic Training	a) Block –I : 3 months b) Block – II : 3 months Total duration of Basic Training: 6 months
Duration of On-Job Training	a) Block–I: 9 months b) Block–II : 9 months Total duration of Practical Training: 18 months
Entry Qualification	Pass in 10th Class examination under 10+2 system of education with science (Physics & Chemistry) as one of the subjects or its equivalent.
Selection of Apprentices	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.
Infrastructure for Basic Training	As per related trade of ITI
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	01 year
CTS trades eligible for MATE (MINES) Apprenticeship	Mate (Mines)

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.

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the LINEMEN (Grinder) course of 02 years duration under ATS.

Block I & II:-

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, Heat & Temperature, Levers & Simple machine, graph, Centre of gravity, Pressure, chemical reaction and combination chemical formula related to mine gases]*
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, Principles of sketching, Blue print reading., Mine sketching – preparing sketch plan of work places involving different kinds of supports, position of equipments, workmen, extraction of stocks, stowing faces.]*
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. Use of Mines outfit and safety gear.
2. Identification of Minerals, rocks and ores.
3. Study of geological disturbances – e.g. folds, faults and other weaknesses.
4. Basic carpentry and use of carpenters and timber mens tools
5. Acquaintance with making and fixing timber and steel supports.

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6. Preparation of crivs, pig staves, mat packs, sets, cross bar etc.
7. Examination of working places and reconnaissance before fixing supports.
8. Fixing of different supports and examination after fixing.
9. Systematic support rules for different underground mines.
10. Scaling and barring of loose.
11. Withdrawal of supports
12. Demonstration of properties of gases
13. Construction of miners flame safety lamps.
14. Standards of ventilation: a) Face Ventilation b) Device for Ventilation
15. Use of self rescuer.
16. Causes and prevention of mine fires: different types of fire extinguisher and their use.
17. Induction: statutory requirements in worked out areas.
18. Mine development: i) Driving, winging and raising, ii) Standard rounds, iii) Allocation of standard men and equipment.
19. Study and assembly of different types of drilling equipment and various accessories including air, legs drill steel lubricators connecting, dust suppression arrangements etc.
20. Drilling shot holes and deep holes.
21. Identification of different types of explosives.
22. Transporting and storing explosives.

BLOCK – II

1. Preparation of correct charges using various explosives.
2. Use of blasting tools. E.g. crimpers, knife, pricklers, crack detector, stemming rods, tester etc.
3. Stemming and charging of shot holes and deep holes.
4. Cautioning and taking shelter before firing.
5. Blasting of shot holes including deep holes various types to be practised.
6. Dealing with blow out shots, mis-fires, etc.
7. Examining work places before and after blasting.
8. Study of layouts of an underground mine.
9. Study of layouts of an open cast mine.
10. Study of methods of mining (open cast and under grounds) methods.
11. Formation of benches.
12. Stability of slopes.
13. Study of loading transporting and scraping.
14. Study of operation and haulage and winding systems.
15. Installation operation and maintenance of signalling systems (emergency and regular)
16. Study and installation of mine drainage systems.

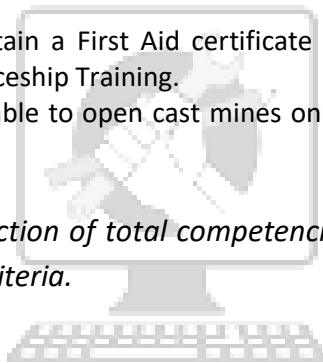
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17. Types of rails and standard practices in track laying.
18. Operation and maintenance of drills, pumps, scampers, loaders, dozers and other face machinery.
19. Operations and maintenance of E.M.M.e.g. shovels, dampers, draglines etc. Used in open cast mining.
20. Hydraulic stowing:
21. Preparation of stopes, laying of pipe storing practice.
22. Receiving instruction and communicating to workmen.
23. Development of workmen and equipment to obtain target production.
24. Handing over charge and writing report.

Note: -

- 1) The apprentice should obtain a First Aid certificate from the competent authority before completion of his Apprenticeship Training.
- 2) Operations skills as applicable to open cast mines only should be followed for mining mate (restricted)

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 Protective 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.

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2. Understand, explain different mathematical calculation & science in the field of study including basic electrical and	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.
apply in day to day work. <i>[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Heat & Temperature, Levers & Simple machine, graph, Centre of gravity, Pressure, chemical reaction and combination chemical formula related to mine gases]</i>	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. <i>[Different engineering drawing- Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Principles of sketching, Blue print reading., Mine sketching – preparing sketch plan of work places involving different kinds of supports, position of equipments, workmen, extraction of stocks, stowing faces]</i>	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	5.1 Explain the concept of productivity and quality

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productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & 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
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& II (Section:10 in the competency based curriculum)	
<i>Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under block – I & block – II (section: 10) must ensure that the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of Planning (Identify, ascertain, estimate etc.); Execution (perform, illustration, demonstration etc. by applying 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information 2) Knowledge of facts, principles, processes, and general concepts, in a field of work or study 3)Desired Mathematical Skills and some skill of collecting and organizing information, communication) and Checking/ Testing to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.</i>	

BASIC TRAINING (Block – I)**Duration: (03) Three Months**

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1.	Use of Mines outfit and safety gear. Identification of Minerals, rocks and ores.	Introduction to mining terminology, duties, safety and responsibilities of Workmen. Rocks and their Characteristics.
2	Basic carpentry and use of carpenters and timber mans tools Acquaintance with making and fixing timber and steel supports.	Formation of Minerals, Loads, Veins, ores, etc. Associated rocks and minerals. Geological disturbances such as folds, faults, washouts, dykes, sills, slips, their effects if mine workings.
3	Preparation of crivs, pig staves, mat packs, sets, cross bar etc.	• The mines act • Metal ferrous mines regulations' • Mines rules • Indian electricity rules (special precaution in mine) • D.G.M.S. Circulars relevant to the occupation/ trade. • Statutory wage structure, managements wage policy.
4	Examination of working places and reconnaissance before fixing supports.	Hanging and footwal, need for artificial supports, support system different kinds and types of supports, mechanism of falls ground, erection of supports, withdrawal of supports, supporting techniques
5.	Fixing of different supports and examination after fixing.	
6.	Systematic support rules for different underground mines.	Examination and testing of supports, general precautions, fencing, purpose , use and type.
7.	Scaling and barring of loose.	Mine plans and projections plan scales, sketching mine workings reading mine plans and projections.
8.	Withdrawal of supports	

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9	Demonstration of properties of gases	Elementary ventilation principles mine atmosphere ventilation appliance, equipments and ventilation measuring instrument etc. Use of measuring instrument. Natural and mechanical ventilation system. Ventilation and of diverges winzes, raises and heading distribution measurement and control of air in mine workings Auxiliary fans-their installation, care and maintenance other ventilation appliances and their maintenance.
10.	Construction of miners flame safety lamps	
11.	Use of self rescuer	
12	Causes and prevention of mine fires: different types of fire extinguisher and their use.	Regulation connected with ventilation in mines. Explosion and fired dust hazards and their control.
13	Internal Assessment/Examination 03days	

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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BASIC TRAINING (Block – II)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1.	Mine development: i) Driving, winging and raising. ii) Standard rounds. iii) Allocation of standard men and equipment.	Winning of ore and minerals (a) open cast (b) underground mining methods. General principles and systems as for working in benches, in opencast mechanized faces in opencast etc. Under hand overhand and breast stopes. Purpose and utility of bore holes, introduction to crushing, beneficiation of R.O.M. Different types of explosives their suitability regulations for transport, storage and used of explosives, techniques of use of different types explosives.
2.	assembly of different types of drilling equipment and various accessories including air, legs drill steel lubricators connecting, dust suppression arrangements etc.	Different types of drill machines. Examinations and placing of shot holes, drill patterns in drivages, winzes, raises and stopes. Preparation and calculation of charge, charging system and technique of firing single shots and shot in rounds with fuses and with different kinds of detonators.
3.	Drilling shot holes and deep holes.	Different kind's explorers and their uses. Uses of delay deroators. Dealing with blown out shorts, misfires sockets. Hand fire etc. Plaster shooting, use of denoting fuses and cortex. Examination of working before and after firing. Warning system and taking shelter, deep hole blasting.
4.	Identification of different types of explosives. Transporting and storing explosives. Preparation of correct charges using various explosives.	Mine layouts, underhand, overhand, and breast, stopes, shafts and incline entrances: Elements after rock mechanism, movement of rock after extracting and track maintenance.

Mate (Mines)

5.	Use of blasting tools. E.g. crimpers, knife, prickers, crack detector, stemming rods, tester etc. Stemming and charging of shot holes and deep holes. Cautioning and taking shelter before firing.	Elementary techniques of ground control. Difficulties Like rock burst, air blast warning system: filling system in stopes. Stopping their necessity, types, construction and maintenance. Track laying, track fittings
6.	Blasting of shot holes including deep holes various types to be practiced. Dealing with blow out shots, mis-fires, etc. Examining work places before and after blasting.	System of loading and transport, storage of materials. Signaling systems, emergency signals, summoning help in distress.
7.	Layouts of an underground mine. Layouts of an open cast mine. Methods of mining (open cast and under grounds) methods.	Drainage layout, sumps, gates and fencing procedure in the event of accident. Mining machinery and equipments in use shaft fitting and equipments.
8.	Formation of benches. Stability of slopes. Loading transporting and scraping.	Flame proof mining equipments and apparatus, pumps, wire ropes, their installation, splicing, replacements system. Winding equipments and controls.
9	Operation and haulage and winding systems. Installation operation and maintenance of signaling systems (emergency and regular) Installation of mine drainage systems.	Generation and use of compresses air, use of internal combustion engines in mines. Relations with superior and sub-ordinate.
10.	Types of rails and standard practices in track laying. Operation and maintenance of drills, pumps, scrapers, loaders, dozers and other face machinery. Operations and maintenance of E.M.M. e.g. shovels, dampers, draglines etc. Used in open cast mining.	Planning for desired outputs in the shift, development of service for maximum results, evaluating work output, elementary work study principles, incentives cost. Occupational health and safety matter, course of first aid certificate.
11	Hydraulic stewing: Preparation of stopes, laying of pipe storing practice. Receiving instruction and communicating to workmen	Communication, motivation, leadership and subordinate development.
12	Development of workmen and equipment to obtain target production.	Accidents: Cause and prevention, accident report.

Mate (Mines)

	Handing over charge and writing report.	Emergency organization: standing orders in case of accident, fires, stoppage of ventilation, emergencies etc.
13	Internal Assessment 03 days	

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.	Simple arithmetic principles and calculations.	Types of lines.
2.	Elementary algebra and practice.	Us of drawing instruments.
3.	Units, measures, weights and volumes and calculations.	Principles of sketching
4.	Simple mechanics principles, levers, pulleys, work friction, power and energy etc.	DIFFERNET TYPES OF PROJECTIONS.
5.	Concept of density, sp, gravity, velocity, acceleration, retardation.	

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Block – II		
Sl. No.	Workshop Calculation and Science (Duration: - 20 hrs.)	Engineering Drawing (Duration : - 30 hrs.)
1.	Laws of motions and calculating related to trade, atmospheric pressure, its measurements etc.	Blue print reading.
2.	Temperature and calorie, temperature scales and conversion.	Mine sketching – preparing sketch plan of work places involving different kinds of supports, position of equipments, workmen, extraction of stocks, stowing faces.
3.	Electrical science principles, voltage, current resistance – Ohm’s law and calculations related to trade.	Drawing – cattles, safety tools, crossing, guide shapes, doors, air, crossings etc.
4.	Elements of chemistry related to the trade namely elements: chemical and compounds and atoms and molecules: chemical reaction and combination chemical formula related to mine gases.	

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9.2 EMPLOYABILITY SKILLS

(DURATION: - 110 HRS.)

Block – I (Duration – 55 hrs.)	
1. English Literacy Duration : 20 Hrs. Marks : 09	
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
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. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. I.T. Literacy Duration : 20 Hrs. Marks : 09	
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
Computer Operating System	Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.
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.
Computer Networking and Internet	Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet,

Mate (Mines)

	Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. 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. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills Duration : 15 Hrs. Marks : 07	
Introduction to Communication Skills	Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
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.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude
Block – II Duration – 55 hrs.	
4. Entrepreneurship Skills Duration : 15 Hrs. Marks : 06	
Concept of	Entrepreneur - Entrepreneurship - Enterprises:-Conceptual issue

Mate (Mines)

Entrepreneurship	Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	Preparation of Project. 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.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity Duration : 10 Hrs. Marks : 05	
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
6. Occupational Safety, Health and Environment Education Duration : 15 Hrs. Marks : 06	
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.

Mate (Mines)

First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation	
Duration : 05 Hrs. Marks : 03	
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
8. Quality Tools	
Duration : 10 Hrs. Marks : 05	
Quality Consciousness	Meaning of quality, Quality characteristic.
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.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR MATE (MINES) TRADE:

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

Block – I

1. Use of Mines outfit and safety gear.
2. Identification of Minerals, rocks and ores.
3. Study of geological disturbances – e.g. folds, faults and other weaknesses.
4. Basic carpentry and use of carpenters and timbermans tools
5. Acquaintance with making and fixing timber and steel supports.
6. Preparation of crivs, pig stayes, mat packs, sets, cross bar etc.
7. Examination of working places and reconnaissance before fixing supports.
8. Fixing of different supports and examination after fixing.
9. Systematic support rules for different underground mines.
10. Scaling and barring of loose.
11. Withdrawal of supports
12. Demonstration of properties of gases
13. Construction of miners flame safety lamps.
14. Standards of ventilation: a) Face Ventilation b) Device for Ventilation
15. Use of self rescuer.
16. Causes and prevention of mine fires: different types of fire extinguisher and their use.
17. Induction: statutory requirements in worked out areas.
18. Mine development) Driving, winging and raising, ii) Standard rounds, iii) Allocation of standard men and equipment.
19. Study and assembly of different types of drilling equipment and various accessories including air, legs drill steel lubricators connecting, dust suppression arrangements etc.
20. Drilling shot holes and deep holes.
21. Identification of different types of explosives.
22. Transporting and storing explosives.

B. BLOCK – II

23. Preparation of correct charges using various explosives.
24. Use of blasting tools. E.g. crimpers, knife, prickers, crack detector, stemming rods, tester etc.
25. Stemming and charging of shot holes and deep holes.
26. Cautioning and taking shelter before firing.

Mate (Mines)

27. Blasting of shot holes including deep holes various types to be practised.
28. Dealing with blow out shots, mis-fires, etc.
29. Examining work places before and after blasting.
30. Study of layouts of an underground mine.
31. Study of layouts of an open cast mine.
32. Study of methods of mining (open cast and under grounds) methods.
33. Formation of benches.
34. Stability of slopes.
35. Study of loading transporting and scraping.
36. Study of operation and haulage and winding systems.
37. Installation operation and maintenance of signalling systems (emergency and regular)
38. Study and installation of mine drainage systems.
39. Types of rails and standard practices in track laying.
40. Operation and maintenance of drills, pumps, scrapers, loaders, dozers and other face machinery.
41. Operations and maintenance of E.M.M. e.g. shovels, dampers, draglines etc. Used in open cast mining.
42. Hydraulic stowing:
43. Preparation of stopes, laying of pipe stowing practice.
44. Receiving instruction and communicating to workmen.
45. Development of workmen and equipment to obtain target production.
46. Handing over charge and writing report.

NOTE: -

- 1) The apprentice should obtain a First Aid certificate from the competent authority before completion of his Apprenticeship Training.
- 2) Operations skills as applicable to open cast mines only should be followed for mining mate (restricted)

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

MATE (MINES)		
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)		
A. TRAINEES TOOL KIT		
Sl. no.	Name of the Tool & Equipments with Specifications	Quantity
1.	Simple geological models – folds, faults, etc.	1 Each
2.	Sample of rocks – different types (specimen)	1 Each
3.	Sample of universals – different types.	1 Each
4.	Strike plate.	1 Each
5.	Lens.	As Required
6.	Hammers.	As Required
7.	Clinometers.	1 Each
8.	Hydrometer (sterrow whisting type).	1 Each
9.	Centigrade thermometers	1 Each
10.	Anemometers/ voltammeters.	1 Each
11.	Miners outfit and that of sirdar/mate/blaster	As Required
12.	Carpentry tools and equipments.	As Required
13.	Measuring scales, tapes, plumb, bobs, spirit, lever, etc.	As Required
14.	Pro-with drawer, buttons, sticks for testing.	As Required
15.	Hammers, crowbar, chisel bar etc.	As Required
16.	Chalk, strings, etc.	As Required
17.	Spanners and tools necessary for rigid supports.	As Required
18.	Self restore.	As Required
19.	Samples of dummy explosives, detoantors and fuses, etc.	As Required
20.	Drilling apparatus and equipments including supply and control panels.	As Required
21.	Holes directors templates.	As Required

Mate (Mines)

22.	Pneumatic drills and accessories.	As Required
23.	Flame safety, magnetic unlocker, electrical lamps, fittings and accessories.	As Required
24.	Gust esting instruments and equipments.	As Required
25.	Methonometers different types.	As Required
26.	Signalling and communicating system.	As Required
27.	Different types of pumps.	As Required
28.	Different types of machines and equipments use.	As Required
29.	Co-detector / maligns detectors, cage with birds.	As Required
30.	Different types of fans.	As Required
31.	Different types of rope haulages/ leaders.	As Required
32.	Models of different types of conveyors including drives and discharge arrangements.	As Required
33.	Haulage roadway with all safety devices.	As Required
34.	Different types of safety hook/staff fittings & equipments.	As Required
35.	Stimulated mine working faces with ventilation circuit, method working support and transport system, etc.	As Required
36.	Model of sinking shaft showing all the detail.	As Required
37.	SHOT FIRING TOOLS : i) Stemming rods. ii) Container with explosives and for detonators. iii) Blank cartridges. iv) Knife. v) Crimper. vi) Crack detector cum scraper. vii) Models of work faces showing pattern of holes, position of cut and order of blasting. viii) Blasting cable. ix) Exploders, different types.	As Required
38.	Haulage rope capels.	As Required
39.	Haulage clips and attachments.	As Required
40.	Different types of wire rope samples.	As Required
41.	Different types of cable samples.	As Required
42.	Drilling tools and machines and accessories (electrical and compressed air).	As Required
43.	Siren etc. For cautioning, muffling arrangements, shelter, etc.	

**INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING
DRAWING**

TRADE: MATE (MINES)

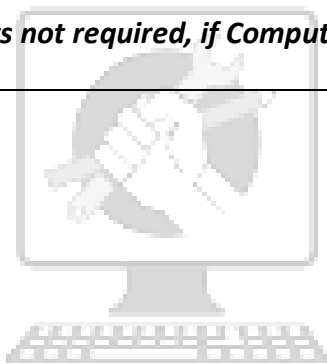
LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

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

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.
Note: - Above Tools & Equipments not required, if Computer LAB is available in the institute.		



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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													