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

COMPETENCY BASED CURRICULUM

STONE MINING MACHINE OPERATOR

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4

SECTOR – MINING AND MINERAL PROCESSING

STONE MINING MACHINE OPERATOR

(Engineering Trade)

(Revised in 2018)

Version: 1.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

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List of Expert members participated for finalizing the course curriculum of Stone Processing Machine Operator Trade.

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CONTENTS

1. COURSE INFORMATION

During the one-year duration of "Stone Mining Machine Operator" Trade, a candidate is trained on Professional Skill, Professional Knowledge and Employability Skill. In addition to this, a candidate is entrusted to undertake project work, extra-curricular activities and on-the-job training to build up confidence. The broad components covered related to the trade are categorized in two semester, each of six months duration. The semester wise course coverage is categorized as below: -

1st Semester - In this semester the trainee will learn Industrial discipline and working environment, safety including fire equipments and their uses. The trainees will identify different types of stones, their dimension & decoration, Commercial varieties and different types of textures in stones. They will also apply the Methods of finding stone strength, chemical composition and physical characteristics. They will be familiar with simple fitting operations, hacks awing, punching and filing. Marking instruments and their uses. Use of vernier calliper, micrometer and method of using drills taps and dies. The trainees will also able to identify Types of hack saw frames and blades, Vernier calliper and Micrometer and their use. The trainees will gain knowledge of Fundamental of electricity. Explanation of electrical measuring instruments Ammeters, Voltmeter and Energy meter. They will also acquire knowledge of characterization of dimensional stone i.e. marble, granite, sand stone, kota stone (flaggy limestone), slate etc. Identifying of the mineral by petrographic examination. They will also able to identify the operation of Machineries and techniques used for various mining operations such as removal of over burden, drilling, hole alignment, blasting wire saw cutting, rock mass separation, block sizing, material handling, block excavation transportation etc. for different stones, Prevention operations and coolant uses. The trainees will get knowledge of Separation of main block(overturning the bench)- Hydraulic jack, Jack Hammer, splitting bag, Air bag, pneumatic(water) bag, Hydraulic excavators sizing of block etc.

2nd Semester - In this semester the trainees will Study stone mining, analysis of deposits, manual mining, sand stone mining, slate mining and granite mining, flaggy limestone mining etc. They will identify different Types of manual and mechanized mining. They will apply manual and mechanized method of mining and various operations of marble mining. They will acquire knowledge of various machinery used for separation of main block like hydraulic jacks, splitting bags-air bags. They will also identify Machinery used for removal of waste rock hydraulic excavator, front end loader. They can apply block handling machinery-jib crane, derrick crane, mobile crane and front loaders. They will also apply service machinery-power generator, air compressor. They will Study on air pollution and water pollution control devices. They can apply Method of using mining safety devices in mines.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the 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.

Stone Mining Machine Operator trade under CTS is delivered nationwide through a network of ITIs. The course is of one-year (02 semesters) duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Workshop Calculation & science, Engineering Drawing and Employability Skills) impart requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by NCVT which is recognized worldwide.

Trainee broadly needs to demonstrate that they are able to:

- Read and interpret technical parameters/ documentation, plan and organize work processes, identify necessary materials and tools.
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations.
- Apply professional knowledge & employability skills while performing the job and modification & maintenance work.
- Check the task/job for functioning, identify and rectify errors in task/job.
- Document the technical parameter related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can join the apprenticeship program in different types of industries leading to a National Apprenticeship Certificate (NAC).
- Can join stone mining industries as Stone Mining Machine Operator.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year (02 semesters):

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	1100
2	Professional Knowledge (Trade Theory)	264
3	Workshop Calculation & Science	88
4	Engineering Drawing	132
5	Employability Skills	110
6	Library & Extracurricular activities	66
7	Project Work	160
8	Revision & Examination	160
	Total	**2080**

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of the course and at the end of the training program as notified by the Government of India (GoI) from time to time. The employability skills will be tested in the first two semesters itself.

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 has to maintain an individual trainee portfolio as detailed in assessment guideline. 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 NTC will be conducted by NCVT at the end of each semester as per the guideline of Government 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 the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percentage for practical is 60% & minimum pass percentage of theory subjects is 40%. For the purposes of determining the overall result, 50% weightage is applied to the result of each semester examination.

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 the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the 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 examining 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 should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • Below 70% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% tolerance dimension achieved while undertaking different work with those

procedures and practices	demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
(c) Weightage in the range of more than 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 achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Brief description of job roles:

Stone Cutter, Mines; makes holes or cuts stone or rock faces in mine with machine or hand tools such as power drill, crowbar, chisel etc. for putting up support or constructing brick foundation. Marks portion of roof and footwall to be cut for insertion of prop. Cuts face of hitches underground and makes hole to desired depth according to diameter to prop, using power drill, crow bar, chisel hammer etc. Removes rubbish and erects roof supports. May drill shot holes for bringing down roof or blowing floor. May build roadways and pack walls of air ways

Mine Cutting and Channeling Machine Operator; operates machinery, such as longwall shears, plows, and cutting machines to cut or channel along the face or seams of coal mines, stone quarries, or other mining surfaces to facilitate blasting, separating, or removing minerals or materials from mines or from the earth's surface. Cuts slots along working faces of coal, salt, or other non-metal deposits in order to facilitate blasting, by moving levers to start the machine and to control the vertical reciprocating drills. Determines locations, boundaries, and depths of holes or channels to be cut. Drives mobile, truck-mounted or track mounted drilling or cutting machine in mines and quarries or on construction sites. Moves controls to start and position drill cutters or torches, and to advance tools into mines or quarry faces in order to complete horizontal or vertical cuts. Moves planer levers to control and adjust the movement of equipment, the speed, height, and depth of cuts, and to rotate swivel cutting booms. Observes indicator lights and gauges, and listen to machine operation in order to detect binding or stoppage of tools or other equipment problems. Repositions machines and move controls in order to make additional holes or cuts. Signals that machine plow blades are properly positioned, using electronic buzzers or two-way radios. Charges and sets off explosives in blasting holes.

Reference NCO-2015:

a) 8111.1200 – Stone Cutter, Mines
b) 8111.1400 – Mine Cutting and Channelling Machine Operator

4. GENERAL INFORMATION

Name of the Trade	**STONE MINING MACHINE OPERATOR**
NCO - 2015	8111.1200, 8111.1400
NSQF Level	Level-4
Duration of Craftsmen Training	One year (Two semesters each of six months duration)
Entry Qualification	Passed 10th class examination under 10+2 system of education with Science and Mathematics or its equivalent.
Unit Strength (No. Of Student)	20 (Max. supernumeraries seats: 6)
Space Norms	100 Sq. m Covered and 250 sq. m open space
Power Norms	10 KW
Instructors Qualification for	
1. Stone Mining Machine Operator Trade	Degree in Civil/Mining/Electrical /Mechanical/ Metallurgy Engineering from recognized Engineering college/ university with one year experience in relevant field. **OR** Diploma in Civil/Mining/Electrical/ Mechanical/ Metallurgy Engineering from recognized board of technical education with two-year experience in relevant field. **OR** NTC/NAC passed in the relevant trade with three-year post qualification experience in the relevant field. **OR** A person having 8 years practical experience in the field of Stone Mining Machines Operator. **Desirable:** Preference will be given to a candidate with Craft Instructor's Certificate. ***Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications.***
2. Workshop Calculation & Science	Degree in Engineering with one year experience. **OR** Diploma in Engineering with two-year experience. **Desirable:** Craft Instructor Certificate in RoD&A course under NCVT.

3. Engineering Drawing	Degree in Engineering with one year experience. **OR** Diploma in Engineering with two-year experience. **OR** NTC/ NAC passed in the Draughtsman (Mechanical / Civil) with three-year experience.
4. Employability Skill	MBA OR BBA with two-year experience OR Graduate in Sociology/ Social Welfare/ Economics with two-year experience OR Graduate/ Diploma with two-year experience and trained in Employability Skills from DGT institutes. **AND** Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above. **OR** **Existing Social Studies Instructors duly trained in Employability Skills from DGT institutes.**
List of Tools and Equipment	As per Annexure – I

Distribution of training on Hourly basis: (Indicative only)

Total Hours/Week	Trade Practical	Trade Theory	Workshop Cal. &Sc.	Engg. Drawing	Employability Skills	Extra-curricular Activity
40 Hours	25 Hours	6 Hours	2 Hours	3 Hours	2 Hours	2 Hours

5. NSQF LEVEL COMPLIANCE

NSQF level for **Stone Mining Machine Operator** trade under CTS: **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
e. Responsibility

The Broad Learning outcome of the **Stone Mining Machine Operator** trade under CTS 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	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.

6. LEARNING/ ASSESSABLE OUTCOME

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

6.1. GENERIC LEARNINGOUTCOME

1. Recognize & comply with 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, Elasticity]*
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, Projections, Assembly drawing, Estimation of material.]*
4. Select 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 execute the work related to the occupation.

6.2. SPECIFIC LEARNING OUTCOME

Semester – I

9. Follow safety procedure, practices and achieve safety standards.
10. Identify various types of stones, their commercial varieties and different types of textures in stones.
11. Apply the methods of finding stones, their properties and testing procedures and identify various types of tools used in stone mining.
12. Perform basic fitting operations – marking, hacksawing, centre punching, filing, drilling, devices-fixing, Funner etc. Accuracy: ± 0.25mm
13. Set the different parameters to measure various physical and electrical components involving basic operations on different machines observing standard procedure and check for accuracy.

14. Carry out Physico-Mechanical tests on stones for identifying minerals.
15. Diagnose & rectify the defects in stone and stone masonry.
16. Dismantle & assemble mining machineries from vehicle along with their accessories.

Semester – II

17. Plan, Execute commissioning and evaluate performance of manual and mechanized mining machines.
18. Remove waste rock by using hydraulic excavator front end loader with safety measures.

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING/ ASSESSABLE OUTCOME	
LEARNING/ ASSESSABLE OUTCOME	**ASSESSMENT CRITERIA**
1. Recognize & comply with 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 of 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 with 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 and explain different mathematical calculation & science in	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, heat & temperature, heat treatment.

the field of study including basic electrical. *[Different mathematical calculation & science - Work, Power & Energy, Algebra, Geometry, Mensuration, Trigonometry, Heat & Temperature, elasticity]*	2.2 Measure dimensions as per drawing 2.3 Use scale/ tapes to measure for fitting to specification. 2.4 Comply with 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 and 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, Projections, Assembly drawing, Estimation of material]*	3.1 Read and interpret the information on drawings and apply in executing practical work. 3.2 Read & analyse the specification to ascertain the material requirement, tools, and 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 measure dimension of components and record data.	4.1 Select appropriate measuring scale/tape/gauges. 4.2 Measure dimension of the components/assembly & compare 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.
6. Explain energy conservation, global warming and pollution	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollution.

and contribute in day-to-day work by optimally using available resources.	
	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 familiarize 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 execute 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 Execute the task effectively.

SPECIFIC LEARNING/ ASSESSABLE OUTCOMES	
LEARNING/ ASSESSABLE OUTCOME	**ASSESSMENT CRITERIA**
SEMESTER-I	
9. Follow safety procedure, practices and achieve safety standards	9.1 Follow industrial discipline related to the trade.
	9.2 Identify various safety instruments.
	9.3 Execute personal safety and occupational health hazards
	9.4 Plan work in compliance with standard safety norms.
	9.5 Observe safety procedure during operation as per standard norms and company guidelines.
	9.6 Identify basic hand tools for fitting, riveting, drilling etc. with due care and safety.
10. Identify various types of stones, their commercial varieties and different types of textures in stones.	10.1 Ascertain various types stones and their properties.
	10.2 Check the different textures in stones for geology and exploration
	10.3 Identify flaggy limestone, slate granite, sandstone etc.
	10.4 Differentiate between dimensional and decorative stones.
	10.5 Check the commercial varieties of different stones.
	10.6 Economical usage of stones.
11. Apply the methods of finding stones, their properties and testing procedures and identify various types of tools used in stone mining	11.1 Find stones as per the methods available.
	11.2 Ascertain the properties of stones.
	11.3 Follow the methods and procedures of testing stones.
	11.4 Enlist the strength, chemical composition and physical characteristics of stones.
	11.5 Identify the various hand tools required for stone mining.
	11.6 Ascertain the safety precautions for handling tools
	11.7 Prepare the job for chiselling, hammering and filling.
	11.8 Use hand tools of steel rule square, scriber and dividers, centre punch, chisels, hammer, files, bench vice and hand vice.
12. Perform basic fitting operations – marking, Hacksawing, Centre punching, Filing, Drilling, devices-fixing, Funner etc. Accuracy: ± 0.25mm	12.1 Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	12.2 Mark as per specification applying desired mathematical calculation and observing standard procedure.
	12.3 Prepare the job for Hacksawing, chiselling, filing, drilling, devices-fixing, funner etc.

	12.4 Observe safety procedure during above operation as per standard norms and company guidelines.
	12.5 Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
13. Set the different parameters to measure various physical and electrical components involving basic operations on different machines observing standard procedure and check for accuracy.	13.1 Identify different electrical equipment viz. Ammeters, Voltmeter, Energy meter etc.
	13.2 Identify electrician hand tools like screw driver, pliers, tester etc.
	13.3 Ascertain safety precautions during operations of electrical hand tools.
	13.4 Prepare the job for cutting and fitting operations.
14. Carry out Physico-Mechanical tests on stones for identifying mineral.	14.1 Check for compressive strength, impact strength, specific gravity etc for stones.
	14.2 Follow petrographic examination for testing stones
	14.3 Identify dimensions of stone products and their parameters.
	14.4 Observe the physical and chemical properties of stones.
	14.5 Test stones based on their properties for their correct use and marketability.
15. Diagnose & rectify the defects in stone and stone masonry.	15.1 Check for cracks in stone and stone masonry.
	15.2 Prepare cement concrete proportion and lime concrete.
	15.3 Use the cement concrete proportion and lime concrete to plaster given stone surface.
	15.4 Fix any sorts of defects in stones.
	15.5 Ascertain safety measures for doing the repairing job.
16. Dismantle & assemble mining machineries from vehicle along with their accessories.	16.1 Identify the machineries and techniques for various mining operations.

	16.2 Identify and remove overburden, drilling, hole alignment, blasting wire saw cutting
	16.3 Plan to dismantle and replace parts as per requirement and collect necessary information.
	16.4 Perform dismantling and replacing of different components with accuracy applying range of skills and standard operating procedure.
	16.5 Assemble different components.
	16.6 Check functionality of the components.
SEMESTER-II	
17. Plan, Execute commissioning and evaluate performance of manual and mechanized mining machines	17.1 Start mining operations work based on the concept of bench planning
	17.2 Perform drilling and channelling operation.
	17.3 Identify jobs for applying wire saw, flame cutting, water channelling, marble mining etc.
	17.4 Remove overburden during transportation and transportation of block
	17.5 Prepare hydraulic jacks, splitting, bags-air bags and hydraulic excavator.
18. Remove waste rock by using hydraulic excavator front end loader with safety measures	18.1 Identify waste rocks for removal.
	18.2 Operate block handling machinery-jib crane, derrik crane, mobile crane and front loaders for removing waste rocks.
	18.3 Identify service machinery- power generator, air compressor.
	18.4 Ascertain air pollution control devices.
	18.5 Observe water pollution devices.
	18.6 Follow mining health and safety measure

8. SYLLABUS

SYLLABUS - STONE MINING MACHINE OPERATOR			
FIRST SEMESTER - 6 MONTHS			
Week No.	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
1	Follow safety procedure, practices and Achieve safety standards.	1. Introduction of the trade in the development of Industrial economy of the country. 2. Industrial discipline and working environment. 3. Familiarization with shop layout. 4. Introduction to safety - including fire equipments and their uses. 5. Necessary guidance to be provided to the new corners to become familiar with the working of industrial training institute.	**Introduction** Brief introduction about the trade. Environmental aspect of stone industry. Impact of stone industry on environment. Environment and environmental pollutions. Personal safety and occupational health hazards. Importance of safety and general precaution observed in the institute.
2-3	Identify various types of stones, their commercial varieties and different types of textures in stones.	6. Stone, an Introduction. 7. Its types - natural stone, sandstone. 8. Flaggy limestone, slate granite, marble etc. 9. Dimensional and decorative stones. 10. Commercial varieties of different stones. 11. Different types of textures in stones.	**Geology and exploration** Geology of dimensional stone resources in India: Explanation of the deposits of marble, granite, sandstone, flaggy limestone, slate etc. are occurring in various parts of India Geology and graphical distribution of different dimensional stones deposits in India viz. marble, granite, sandstone, limestone, slate etc. Characteristics of various stones Commercial verities of different stones Textures in different

			stones Physico mechanical properties of stones Chemical properties of various stones Different types of textures in stones
4-5	Apply the methods of finding stones, their properties and testing procedures and Identify various types of tools used in stone mining	12. Methods of finding stone strength, chemical composition and physical characteristics. 13. Tools: use of steel rule, square, scriber and dividers, centre punch, chisels, hammer, different files, bench vice and hand vice.	Properties of stones. Stone testing procedure. Safety precautions and elementary first aid, common hand tools of fitter trade-their name description and material.
6-7	Perform basic fitting operations – marking, Hacksawing, Centre punching, Filing, Drilling, devices-fixing, Funner etc. Accuracy: ± 0.25mm	14. Saw, centre punch, filing to line. 15. Filling a work-piece flat and training devices-fixing of mating nut. 16. Locking pins. 17. Hand tools: straight edge bloom bob, square etc.	Description of simple fitting operations, hacks awing, punching and filing. Types of files. Marking instruments and their uses. Use of vernier caliper, micrometer.
8	-Do-	18. Funner – its use. 19. Chipping, chisels, cold chisel, round nose threading and tapping, dieing, making external threads. 20. To prepare edges of stone on grinding machine and check.	Method of using drills taps and dies. Description of simple drilling machine-safety precautions-in handling grinding machines.
9	-Do-	21. Sawing filing to given diffusions-filing true and square notice different types of file operations-marking and clear and blind holes. 22. Opening of twist drills safety points to be observed while operating a drilling machine.	Types of hack saw frames and blades- their selections and uses types of files and their uses. Care and maintenance of files. Types and sizes of drills-cutting angles and speeds of drills calculation of tap drill sizes.

10	-Do-	23. Measuring internal and external dimensions by the use of vernier caliper and micrometer.	Vernier caliper and Micrometer - uses, least count, vernier scale main scale and function of vernier caliper and micrometer.
11	Set the different parameters to measure various physical and electrical components involving basic operations on different machines observing standard procedure and check for accuracy.	24. Practice in using cutting pliers, screw driver. 25. Demonstration and practice bare conductor, joints such as Britannia, straight tee, western union joint.	Fundamental of electricity. Electron theory-free electron fundamental terms, definition, unit and effects of elastic units.
12	-Do-	26. Demonstration on elementary first aid, artificial respiration.	Various safety measure involved in the industry. Elementary first aid.
13	-Do	27. Study and use of Ammeters, Voltmeter, Energy meter etc.	Explanation of electrical measuring instruments Ammeters, Voltmeter, Energy meter only explanation of work, power energy in DC circuit.
14	-Do-	28. Demonstration of electrician hand tools like screw-driver, pliers, tester and other hand tools.	Identification of electrician hand tools.
15-16	Carry out Physico-Mechanical tests on stones for Identifying mineral.	29. Identifying of the mineral by petrographic examination. 30. Physico-Mechanical Test for selection of natural stone. 31. Checking of compressive strength, impact strength, elastic constant, density / specific gravity.	Introduction to characterization of dimensional stone i.e. marble, granite, sand stone, kota stone (flaggy limestone), slate etc. for their correct use & marketability. Applications of all dimension stone products and their parameter. Introduction to petrographic, physical and mechanical properties of stones, testing of stones etc.
17	Diagnose & rectify the defects in stone and stone masonry	32. To repair crakes in stone, stone masonry and knowledge to pointing out	Defect in stones and their repair, precaution to be taken in stone fixing, restoration and

		the defects.	conservation, merit and demerits in stone masonry / uses
18	-Do-	33. To prepare cement concrete proportion and lime concrete to plaster given stone surface and fixing of stones.	Concepts of water cement ratio work ability. Tools required for fixing, and repairing of stones and for plastering.
19	Dismantle & assemble mining machineries from vehicle along with their accessories.	34. Machineries and techniques used for various mining operations such as removal of over burden, drilling, hole alignment, blasting wire saw cutting,, rock mass separation, block sizing, material handling, block excavation transportation etc. for different stones, Prevention operations and coolant uses. 35. Uses of Drilling Operating system Such as vertical, horizontal and their uses of different types of stone tool, Prevention operations and coolant uses.	Introduction to mining machineries. Selection of mining machineries. The factors for selecting of mining machineries. Machineries used for various operations such as cutting, drilling, removing, sizing, transportation etc. Brief concept of mining and bench planning Drilling-Description, working principal, Construction & Major parts, alignment of holes etc. Safety & Precaution of drilling. Uses of drill the stone sector
20	-Do-	36. Demonstration and Practice on dragging winch, Use of dragging block of granite, marble and other natural stones. Various components of air compressor, Defects and brief demonstration of types of power generator.	Dragging winch: Description, working principal, Construction of Major Parts. Compressor-Description & various types of compressor. such as pneumatic, hydraulic system & jack for stone
21-22	-Do-	37. Uses of stone mining machineries and their preventive operation, such as quarry front cuts-Chain	Different types of stone mining machinery uses: Construction & working principal of quarry front cuts-Chain saws, Diamond

		saws, Diamond belt saw, Diamond wire saw, Jiri M/c (kotah stone),Flame jet burner, water jet technique, Drilling – 38. Performatic drilling: Slot drill/quany master, drill for coplanar holes, Quarry bar m/c, Jack Hammer. 39. Separation of main block(overturning the bench)- Hydraulic jack, Jack Hammer, splitting bag, Air bag, pneumatic(water) bag, Hydraulic excavators sizing of block –diamond wire saw, jack hammer, Feather &wedges Removal waste block-Hydraulic excavators, Tippers, Front & Loader Other service machinery- Power generator, Air compressor, hole finder (Cerca fori).	belt saw, Diamond wire saw, Jiri M/c (kotah stone), Flame jet burner, water jet technique. Construction & working principal of drilling Performatic drilling : Slot drill/quany master, drill for coplanar holes, Quarry bar m/c, Jack Hammer Construction & working principal of separation of main block (overturning the bench)- Hydraulic jack, splitting bag, Air bag, pneumatic(water) bag, Construction working principal of Hydraulic excavator. Construction & working principal of sizing of block – diamond wire saw, jack hammer, Feather &wedges, air pillows. Construction & working principal of removal waste block Construction & working principal of Block handling machinery- Jib crane, Derrick crane, Mobile crane, Front & Loader. Construction & working principal of other service machinery Power generator, Air compressor, hole finder(Cerca fori).
23-24	**Project Work/ Industrial Visit-** **Broad area:** a) Basic fitting operations. b) General maintenance of Mining machineries. c) Physico –mechanical tests		

25	**Revision**
26	**Examination**

Note: -

1. *Some of the sample project works (indicative only) are given against each semester.*
2. *Instructor may design their own project and also inputs from local industry may be taken for designing such new project.*
3. *The project should broadly cover maximum skills in the particular trade and must involve some problem solving skill. Emphasis should be on Teamwork: Knowing the power of synergy/ collaboration, work to be assigned in a group (Group of at least 4 trainees). The group should demonstrate Planning, Execution, Contribution and Application of Learning. They need to submit Project report.*
4. *If the instructor feels that for execution of specific project more time is required than he may plan accordingly to produce components/ sub-assemblies in appropriate time i.e., may be in the previous semester or during execution of normal trade practical.*

SYLLABUS - STONE MINING MACHINE OPERATOR			
SECOND SEMESTER – 06 Months			
Week No.	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
27-39	Plan, Execute commissioning and evaluate performance of manual and mechanized mining machines	40. Concept of bench planning and how to start mining operations. 41. Drilling and channeling operation. 42. Separation of block application of blasting technique. 43. Diamond wire saw cutting technique. 44. Application of wire saw, flame cutting, water channeling, marble mining. 45. Removal of overburden. 46. Preparation of free faces. 47. Preparation of block and transportation of block and overburden. 48. Application of diamond wire saw, chain saw and belt saw. 49. Application of machinery used for separation of main block. 50. Hydraulic jacks, splitting, bags-air bags. 51. Hydraulic excavators.	Study of stone mining, analysis of deposits, manual mining, sand stone mining, slate mining and granite mining, flaggy limestone mining etc. Types of manual and mechanized mining. Manual method of mining and various operations. Mechanized method of marble mining and operations. Description of various machinery used for separation of main block like hydraulic jacks, splitting bags-air bags. Hydraulic excavators.
40-41	Remove waste rock by using hydraulic excavator front end loader with safety measures	52. Application of machinery used for removal of waste rock. 53. Hydraulic excavator front end loader.	Description of machinery used for removal of waste rock hydraulic excavator, front end loader.
42-43	-Do-	54. Application of block handling machinery-jib crane, derrick	Description of block handling machinery-jib crane, derrick

		crane, mobile crane and front loaders.	crane, mobile crane and front loaders.
44-45	-Do-	55. Application of service machinery-power generator, air compressor.	Description of service machinery-power generator, air compressor.
46	-Do-	56. Study on air pollution control devices.	Impact of stone industry on, environment and environmental pollution.
47	-Do-	57. Study on water pollution devices.	Water pollution, quarry waste and its application environmental problem due to marble slurry.
48	-Do-	58. Mining health and safety measure.	Method of using mining safety devices in mines.
49-50	**Project work/ Industrial Visit: -** a) Visit to stone mines to study the construction and operation of the machines.		
51	**Revision**		
52	**Examination**		

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

First Semester **Duration: Six Months**		
S No.	**Workshop Calculation and Science**	**Engineering Drawing**
1.	**Unit**: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	Engineering Drawing: Introduction and its importance - Relationship to other technical drawing types - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003
2.	**Fractions**: Fractions, Decimal fraction, L.C.M., H.C.F., Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Scientific Calculator.	Drawing Instruments: their Standard and uses - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins/ Clips.
3.	**Square Root**: Square and Square Root, method of finding out square roots, Simple problem using a calculator.	Lines : - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, center, construction, Extension, Dimension, Section) - Drawing lines of a given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
4.	**Ratio &Proportion**: Simple calculation on related problems.	Freehand drawing of - Lines, polygons, ellipse, etc.

		- Geometrical figures and blocks with dimension Transferring measurement from the given object to the free hand sketches.
5.	**Percentage**: Introduction, Simple calculation. Changing percentage to fraction and decimal & vice-versa.	Lettering and Numbering as per BIS SP46-2003: - Single Stroke, Double Stroke, inclined, Upper case and Lower case. Dimensioning: Definition, types and methods of dimensioning (functional, non-functional and auxiliary), Types of arrowhead - Leader Line with text
6.	**Material Science**: Properties-Physical & Mechanical, Types–Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of wood (Iron), Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous Alloys.	Drawing of Geometrical Figures: Definition, nomenclature and practice of: - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
7.	**Mass, Weight and Density**: Mass, Unit of Mass, Weight, difference between mass and weight. Density,unit of density.Relation between mass, weight & density. Simple problems related to mass, weight, and density.	Sizes and Layout of Drawing Sheets - Basic principle of Sheet Size - Designation of sizes - Selection of sizes - Title Block, its position and content - Borders and Frames (Orientation marks and graduations) - Grid Reference - Item Reference on Drawing Sheet (Item List)
8.	**Speed and Velocity**: Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation, equations of motions, simple related problems.	Method of presentation of Engineering Drawing - Pictorial View - Orthographic View - Isometric view
9.	**Work, Power and Energy**: work, unit of work, power, unit of power, Horsepower of	Symbolic Representation used in the

	engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.	related trade (as per BIS SP:46-2003) of: - Fastener(Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings
Second Semester **Duration: Six Month**		
1.	**Basic Algebra**: Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Construction of Scales and diagonal scale
2.	**Mensuration:** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semicircle Volume of solids – cube, cuboid, cylinder and Sphere. Surface area of solids – cube, cuboid, cylinder and Sphere.	**Dimensioning practice:** - The position of dimensioning (unidirectional, aligned, as per BIS SP:46-2003) Symbols preceding the value of the dimension and dimensional tolerance.
3.	**Trigonometry:** Trigonometrical ratios, measurement of angles. Trigonometric tables	Drawing of Solid figures (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions. Drawing of Solid figures (Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.
4.	**Elasticity:** Elastic & Plastic material. Stress & strain and their units. Young's modulus. Ultimate stress and breaking stress.	Free Hand sketch of hand tools and measuring tools used in the respective trades.
5.	**Heat & Temperature**: Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, Scale of temperature, relations between different scale of temperature. Thermometer, pyrometer. Transmission of heat, conduction, convection, radiation. Thermal Conductivity, Heat loss and heat gain.	**Projections:** - Concept of axes plane and quadrant. - Orthographic projections - Method of first angle and third angle projections (definition and difference) - Symbol of 1st angle and 3rd angle projection as per IS specification.

6.	**Basic Electricity**: Introduction, use of electricity, how electricity is produced, Types of current_ AC, DC, their comparison, voltage, resistance, and their units. Conductor, insulator, Types of connections – series, parallel, electric power, Horsepower, energy, unit of electrical energy. - Electrical insulating materials. - Basic concept of earthing.	Drawing of Orthographic projection in 3rd angle.
7.	**Levers and Simple Machines:** Levers and its types. Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine, Relationship between Efficiency, velocity ratio and Mechanical Advantage.	Drawing of simple fastener (Rivet, Bolts, Nuts & Screw) - Riveted Joints-Butt & Lap (Drawing one for each type).
8.	- Area of irregular surfaces. - Application related to shop problems.	Free hand sketching of simple objects related to trade.
9.	- Material weight and costing - problems related to trade.	- Reading of drawing. Simple exercises related to missing lines, dimensions. How to make queries. - Simple exercises relating missing symbols. - Missing views
10.	- Heat treatment and its necessity.	- Concept of preparation of assembly drawing and detailing. Preparation of simple assemblies & their details of trade related job/exercises with the dimensions from the given sample or models.
11.	-	Reading of fabricated engineering drawing

9.2 EMPLOYABILITY SKILLS

CORE SKILL – EMPLOYABILITY SKILL	
First Semester	
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 known people, 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 on messages and filling in message forms, Greeting and introductions, office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. IT Literacy	**Duration : 20 hrs** **Marks : 09**
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of the 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, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, WebsSite, 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
Second Semester	
4. Entrepreneurship Skills	**Duration : 15 hrs** **Marks : 06**
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises: Conceptual issue 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. Difference between small scale &large scale business, Market survey, Method of marketing, Publicity and advertisement, Marketing mix.
Institution's 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 familiarize 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 it improves or slows down productivity.
Comparison with Developed Countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in select 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 hygiene, occupational diseases/ disorders & its prevention.	
Accident &Safety	Basic principles for protective equipment. Accident prevention techniques - control of accidents and safety measures.	
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 housekeeping, Practice of good housekeeping.
Quality Tools	Basic quality tools with a few examples.

ANNEXURE-I

LIST OF TOOLS AND EQUIPMENT			
STONE MINING MACHINE OPERATOR (For Batch of 20 Trainees)			
A. TRAINEES TOOL KIT (For each additional unit, trainees tool kit S No. 1-20 is required additionally)			
S No.	**Name of the Tool &Equipments**	**Specification**	**Quantity**
1.	Steel Rule	300 mm	21 Nos.
2.	Try Square	150 mm	21 Nos.
3.	Spring caliper, out side	150 mm	21 Nos.
4.	Spring caliper, in side	150 mm	21 Nos.
5.	Caliper, hermaphrodite	150 mm	21 Nos.
6.	Spring divider	150 mm	21 Nos.
7.	Scriber	150 mm	21 Nos.
8.	Centre punch	100 mm	21 Nos.
9.	Dot punch	100 mm	21 Nos.
10.	Chisel flat cold	20 mm	21 Nos.
11.	Chisel cross cut	20 mm	21 Nos.
12.	Hammer ball pein	500 gram	21 Nos.
13.	Hammer cross pein	250 gm	21 Nos.
14.	File flat Bastard	250 mm	21 Nos.
15.	File flat second cut	200 mm	21 Nos.
16.	File smooth	200 mm	21 Nos.
17.	Hacksaw frame adjustable	250-300 mm	21 Nos.
18.	Scraper flat	150 mm	21 Nos.
19.	Scraper half round	150 mm	21 Nos.
20.	Scraper triangular	150 mm	21 Nos.
B. GENERAL SHOP OUTFIT			
21.	Bench vise	120 mm	10 Nos.
22.	Vernier micrometer outside	0 to 25 mm	2 Nos.
23.	Dial micrometer outside	50 to 75 mm	2 Nos.

24.	Vernier calipers	200 mm	2 Nos.
25.	Vernier height gauge	300 mm	2 Nos.
26.	Inside micrometer	50 mm to 100	2 Nos.
27.	Depth micrometer	0 to 100 mm with extension	2 Nos.
28.	Taps and dies course series	6 to 25 mm	2 Set
29.	Surface plate	400 and 400 mm grade 2mm	2 Nos.
30.	Universal marking block		2 Nos.
31.	Neon Tester	500 Volts	4 Nos.
32.	Test lamp	200 volt 25 watt	4 Nos.
33.	Hand techometer with male and female above rubber plug resin case		2 Nos.
34.	Moving iron and ammeter portable type		2 Nos.
35.	Multimeter (AVO)		2 Nos.
36.	Insulator screw driver	150 mm, 200 mm	20 Nos.
37.	Insulator combination cutting plier side	200 mm	4 Nos.
38.	Connector	100 mm	4 Nos.
C. GENERAL MACHINERY			
39.	Drilling Machine	0 to 200 mm Capacity Motorised with Chuck and key	1 Set
40.	Drill HSS	6mm to 12mm in steps of 1 mm	2 Set
41.	Drill Angle Gauge		2 Set
42.	Drilling Machine Motorized pillar	20 mm Capacity	lSet
43.	Steel Tape one Meter		1 No.
44.	Direct Reading vernier caliper	200 mm	1 No.
45.	Diamond Wire-Saw/ Chain Saw		1 No.
46.	Slot Drill		1 No.
47.	Jack Hammer		1 No.
48.	Hydraulic Jack		1 No.
49.	Air Bag / Pillow		1 No.
50.	Water Bag		1 No.
51.	Jib Crane		1 No.

52.	Mobile Crane		1 No.
53.	Front end loader		1 No.
54.	Power Generator		1 No.
55.	Air Compressor		1 No.
56.	Artificial respirator		4 Nos.
C. FURNITURE AND TEACHING AIDS			
57.	Wall charts		10 Nos.
58.	LCD projector		1 No.
59.	WHITE Board		1 No.
60.	Adjustable steel Pointer		2 Nos.
61.	Dual desk		10 Nos.
62.	Instructor Table		1 No.
63.	Instructor chair		1 No.
64.	Almirah (cup board)		2 Nos.
65.	Steel rack		2 Nos.
66.	Computer table		2 Nos.
67.	Computer chair		4 Nos.
68.	Lockers with 8 Drawers (standard size)		3 Nos.
69.	Water dispenser		1 No.
D. COMPUTER HARDWARE AND SOFTWARE			
70.	Computer with latest configuration		10 Nos.
71.	Laser Printer (B/W)		01 No.
72.	Scanner		01 No.
73.	Software package for stone design (latest version) educational version		01 No.
74.	Designing books and CD		As required

TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
S 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.		

ANNEXURE-II

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:														
SNo	**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														