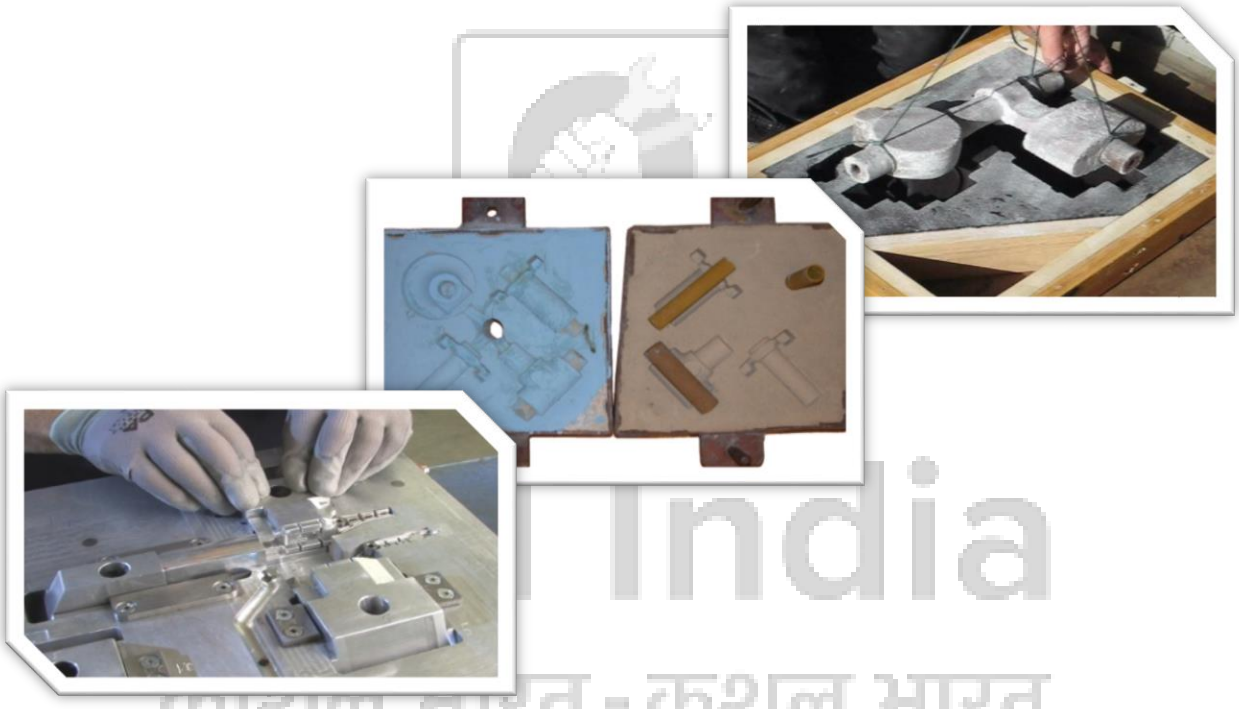
PATTERN MAKER

COMPETENCY BASED CURRICULUM

(Duration: 1 Year 3 Months)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 3



SECTOR – Production and Manufacturing

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

PATTERN MAKER

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL - 3

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
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Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

Co-ordinator for the course: Sh. Nirmalya Nath., ADT

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1.	Shri H.S.N Murthy Rao, Director	ATI, Madras	Chairman
2.	Shri T.V.K Kidao, Proprietor,	M/S Madras Metallurgical Services (P) Ltd., Madras	Member
3.	Shri A.V. Sethuraman, Foundry Super intendant	M/S Binny's Engineering works, Madras	Member
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6.	Shri V. Srinivasan, Special Officer (CDL)	DET, Tamil Nadu	Member
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9.	Shri K.A. Sivagnanam, Dy. Director	RDAT, Guindy, Madras	Member

CONTENTS

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.

2. TRAINING SYSTEM

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.

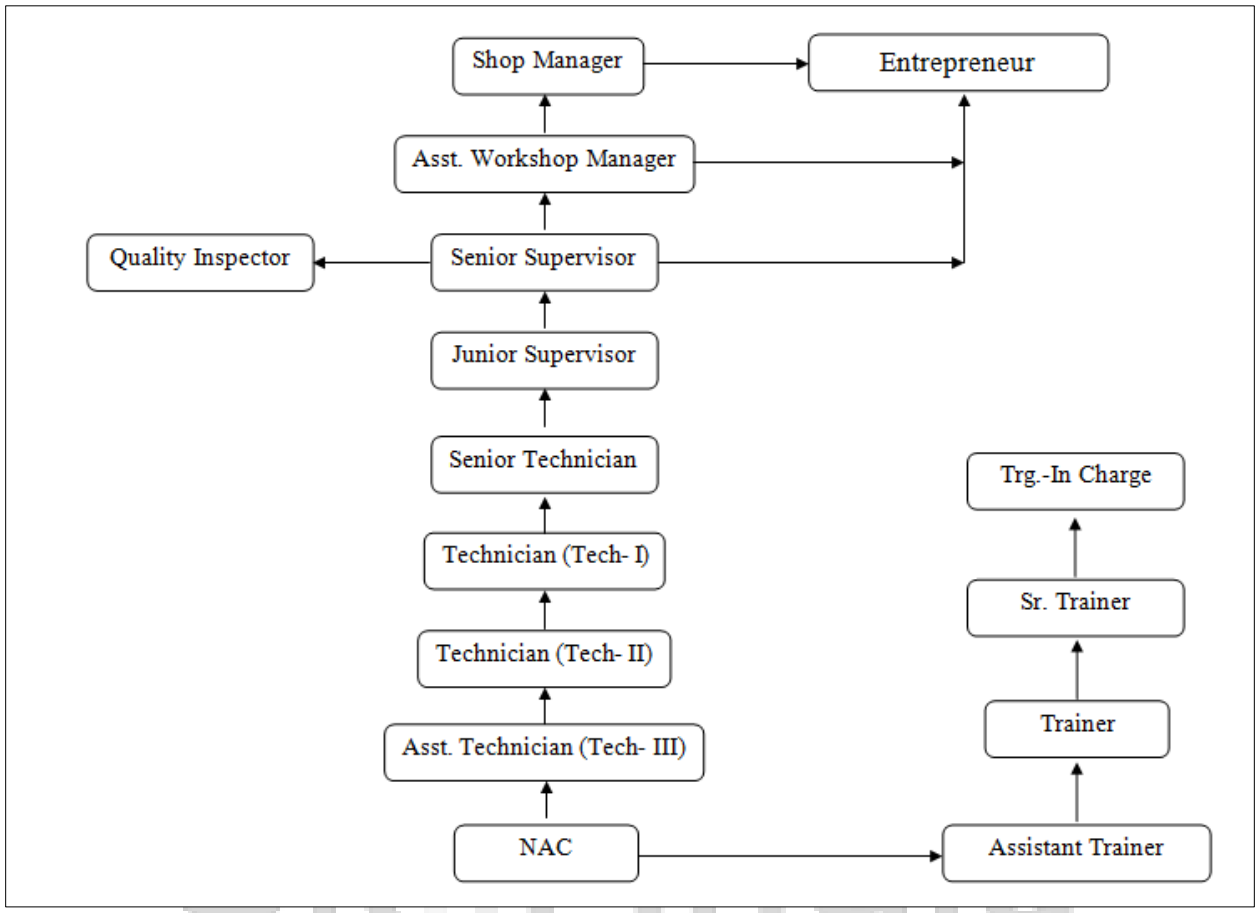
Pattern Maker trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of 01 year 03 months (01 Block of 15 months including basic training) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by NCVT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

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

2.2 CAREER PROGRESSION PATHWAYS:

- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

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

Total training duration details: -

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

A. Basic Training

For 02 yrs. course (Engg.) :-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)
For 01 yr. course (Engg.) :-(**Total 03 months:** 03 months in 1st yr.)

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

B. On-Job Training:-

For 02 yrs. Course (Engg.) :- (**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)
Notional Training H ours for On-Job Training: 3120 Hrs.
For 01 yr. course (Engg.) :-(**Total 12 months**)
Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

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

2.4 ASSESSMENT & CERTIFICATION:

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

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

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

2.4.1 PASS REGULATION

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

2.4.2 ASSESSMENT GUIDELINE

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

Assessment will be evidence based comprising the following:

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

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

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate	• Demonstration of good skill in the use of

with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	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.

3. JOB ROLE

Brief description of Job roles:

Pattern Maker, Wood makes and repairs wooden patterns from drawings or samples for making moulds to cast metals using hand or power tools or both. Studies drawings or sample, calculates sizes and quantity of timber required. Selects right type of timber for making pattern. Saws, adzes and planes oversize pieces to required size and marks them with shrinkage allowance, using construction scale calipers, divider, pencil, scribber etc. Drills holes and fixes dowels for assembling detachable parts and screws or nails other pieces permanently as necessary. Builds up undersized portions by nailing or screwing card board, plywood, thin pieces of wood or by applying putty as required. Assembles completed pattern, checks measurements and rectifies defects if any. Fills superfluous holes with molten sealing wax or with any other filling, Smoothens surface by filling or with sand paper for better finish. Sharpens his own tools. May apply preservative coating of solution of shallac and spirit or any other water proof paint.

Pattern Maker Metal, Foundry makes and repairs metal patterns for making moulds for casting metals. Studies drawings and other specification of pattern to be made and calculates shrinkage allowances. Takes metal cast roughly to shape or selects metal from stock and marks it off. Grinds, smoothens and other wise shapes metal to required dimensions keeping shrinkage allowances in view. Measures object (pattern) frequently while working with callipers, foot rule, gauges etc. to ensure correct shape and size. Assembles pattern parts by screwing, soldering or otherwise fixing them together. Checks completed pattern for accuracy using gauges, micrometre, callipers, etc. and makes alterations if necessary. May repair broken or damaged patterns.

Reference NCO:

i) 7522.1000 (Pattern Maker, Wood)
ii) 7222.0800 (Pattern Marker, Metal Foundry)

4. NSQF LEVEL COMPLIANCE

NSQF level for PATTERN MAKER trade under ATS: **Level 3**

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 PATTERN MAKER trade under ATS mostly matches with the Level descriptor at Level- 3.

The NSQF level-3 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 3	Person may carry out a job which may require limited range of activities routine and predictable	Basic facts, process and principle applied in trade of employment	Recall and demonstrate practical skill, routine and repetitive in narrow range of application	Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, person al banking, basic understanding of social and natural environment	Under close supervision Some Responsibility for own work within defined limit.

5. GENERAL INFORMATION

Name of the Trade	**Pattern Maker**
NCO - 2015	**7522.1000, 7222.0800**
NSQF Level	Level – 3
Duration of Apprenticeship Training (Basic Training + On-Job Training)	3 months + 1 year (01 Block of 15 months duration including basic training)
Duration of Basic Training	a) Block –I : 3 months **Total duration of Basic Training: 3 months**
Duration of On-Job Training	a) Block–I: 12 months **Total duration of Practical Training: 12 months**
Entry Qualification	Passed 8th class Examination under 10+2 system of education or its equivalent.
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by NCVT.
Rebate to Ex-ITI Trainees	03 months
CTS trades eligible for Pattern Maker Apprenticeship	Pattern Maker

Note:

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

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the PATTERN MAKER trade course of 01 years 03 months duration under ATS.

Block I:-

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

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Safety and best practices/Basic Industrial Culture (5S, KAIZEN, etc.)
2. Prepare different types of documentation as per industrial need by different methods of recording information.

3. Prepare patterns of circular from involving turning formation or construction of arms (odd and even numbers) building up rims in segmental construction such as hand wheels flanged rims in pulleys rope pulleys.
4. Prepare section or segment core boxes for wheels pulleys for preparing moulds by core assembly.
5. Make the patterns with cover core print such as patterns for piston, elbow with side outlet and their core boxes.
6. Prepare split patterns with non-identical cope and drag parts involving working out curved forms from solid stock such as patterns for lathe tail stock, shackle, pipe vice, bench vice and their core boxes.
7. Finish and paint of patterns as per ISI colour scheme.
8. Make pattern in 'Shell' form involving turning internal, external shapes on curving out by hand tools such as patterns for cylinder head, electric motor side shell C.I. switch box cover.
9. Prepare "Follow board for Shell" form pattern using plaster of paris.
10. Prepare pattern for air chamber and its core model involving turning.
11. Prepare core box for air chamber pattern by joining series of strip (b) using plaster of paris.
12. Make the patterns involving web and rib, construction of thin section such as pattern for J hanger bracket.
13. Prepare patterns and core boxes for various types of valve.
14. Prepare pattern for pipes and their core boxes involving building of stock in stepped form and finishing them such as water jacked pipe and its core boxes.
15. Prepare patterns for pipes and elbows and their core boxes involving staved construction.
16. Make the pattern for gear wheels, sprocket wheels involving turning and formation of teeth.
17. Prepare segment or part core boxes for gear wheel patterns for making moulds by core assembly.
18. Prepare "Master Patterns" for casting metal patterns and core boxes. *
19. Finish cast metal patterns and core boxes by hand tools and machine tools. *
20. Prepare moulds using plaster of paris epoxy resins.*
21. Prepare patterns and core boxes using epoxy resins.*
22. Make the skeleton patterns and core boxes with strickles.
23. Prepare and mount various types of patters on match plates (Wooden and metal) including gating systems.
24. Make the patterns for chills for producing chilled castings.
25. Prepare patterns for core dryers of various forms.
26. Make the different types of production patterns.*

27. Use of production patterns for machine mould.*
28. Perform the various operations on wood working machines used for pattern making.*
29. Inspection of patterns and core boxes.*
30. Inspect of casting/ Dimensional layout of casting. *
31. Repair and maintenance of the patterns and core boxes.*
32. Observe the machine shop during various machining operations.*
33. Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

Note: *Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria. The operation skills marked (*) are mandatory.*

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

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

electrical and apply in day to day work.*[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]*	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation & earthing.
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]*	3. 1. Read & interpret the information on drawings and apply in executing practical work.
	3. 2. Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	3. 3. Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. Select and ascertain measuring instrument and measure dimension of components and record data.	4.1 Select appropriate measuring instruments as per tool list.
	4.2 Ascertain the functionality & correctness of the instrument.
	4.3 Measure dimension of the components & record data to analyse the with given drawing/measurement.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts
6. Explain energy	6.1 Explain the concept of energy conservation, global

conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	warming, pollution and utilize the available recourses 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	
<u>Block-I</u>	
*Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under **block – I** (section: 10) must ensure that the trainee performs job that requires limited range of activities which are routine and predictable. Assessment criteria should broadly cover the aspect of **Planning** (Identify, ascertain, etc.); **Execution** (perform, illustration, etc. by applying basic methods, tools, materials and information 2) Knowledge of basic facts, process and principle applied in trade of employment) Basic Mathematical Skills 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 within defined limit.*	

8. SYLLABUS

BASIC TRAINING (Block – I)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1	Safety: - its importance, classification, personal, general, workshop and job safety. Occupational health and safety. Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Importance of housekeeping & good shop floor practices. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Fire& safety: Use of Fire extinguishers.	Importance of safety and general precautions observed in the in the industry/shop floor. All necessary guidance to be provided to the new comers to become familiar with the working of Institute system including stores procedures. Introduction of First aid. Safety attitude development of the trainee by educating him to use Personal Protective Equipment (PPE). Response to emergencies eg; power failure, fire, and system failure. Accidents- Definition types and causes. First-Aid, nature and causes of injury and utilization of first-aid. Introduction to 5S concept & its application. Fire: - Types, causes and prevention methods. Fire Extinguisher, its types. Global warming its causes and remedies. Industrial Waste its types, sources and waste Management.
2	Metal work (Fitting). Use of steel rules, scribers, dividers, engineers' squares, calipers, chisels, hacksaws, files, punches and hand drilling machine etc. Simple operations such as chipping, sawing, filling, drilling, marking out from blue prints and simple fitting of two parts. Reading of standard and contraction rules, simple operations such as hand sawing, hand planing, marking, chiseling, gauging & sharpening of tools.	Importance of safety & general precautions observed in the section. Importance of the trade in the development of industrial economy of the country. Safety precautions. Description and uses of fitters' hand tools. Description of various measuring instruments. Types of files. Classification of files. Filing procedure. Description, uses and manipulation of measuring tools, common saws, planes, try square and gauges.
3	Making of various joints such as	Description, types, uses and manipulation of

	cross half lap joints, 'T' lap joints, dovetail halving corner bridle joint, mortice and tenon joint. Wood turning in lathe to make various shapes; turning tools sharpening and grinding. Making simple jobs on wood turning lathe.	chisels, drill and braces; types of drills, files & calipers; care & maintenance of above tools Description, types and uses of vices, screw drivers, shapening stones, work bench, turning tools (wood), miscellaneous tools such as glue pot, glue brush, painting brush, spirt level and plumb bob etc. Uses of raw materials and joining materials; machine tools-their parts, uses and maintenance-safety precautions.
4	**Moulding :** Machinery used in the trade, types of jobs made by the trainees in the trade, introduction to safety including firefighting equipment and their uses etc. Sand mixing, sifting & tempering by shoval, sieve etc. Preparation of facing sand and backing sand. Preparation of simple mould in the pit using facing and backing sand.	Importance of moulding trade training; Types of foundries-advantages of moulding and casting process. Use of bottom board or mould board. Various terms & materials used in moulding process such as ramming, venting, silica sand, clay etc. -their meaning and explanation. Moulding, tools; sieves, trowels, rammers, cleaners, shovels and strike off bar etc. -their care, maintenance & use.
5	Practice in preparing a bend pipe core. Practice in reinforce-ment & driving the core. Dressing of the core. Practice in making the cores such as vertical core, Horizontal core & balancing core Trade Training (Pattern Making): Making layouts of simple patterns showing draft, machining and other allowances.	Core and its purpose, Terms and materials used in core making, safety precautions to be observed while making a core. Use of rapping and lifting plates. Amount of shirnkage allowances for small casting and large casting in different types of metals. Allowances for draft, drag and cope; shake allowance & machining allowance. Types of core boxes such as half core box, whole core box, dump core box, framed core box, core box for vertical core, core box for horizontal core & cover core on hanging core. Use of symbols for machining and finishing the surface of the job. Use of sand-paper for finishing the job. Technique and procedure for making simple patterns and description of tools used.
6	Making simple patterns such as patterns having draft and contraction allowances & Pattern of round block (one piece pattern). Making simple hollow pattern	Terms relating to pattern making. Use of draft, shrinkage, finish, machine etc. Principles of making the mould from a hollow pattern. Types of layout board. Advantages & disadvantages of different types of boards. Selection of suitable timber for the job. Kinds of

	with outside & inside draft. Blue-Matching techniques & method for mating parts & patterns.	timber used in pattern making. Cross - section of a log. Deciding parting line for a built-up pattern.
7	Making a simple pattern having a cored hole (by solid construction).	Wood technology-tree growth, classification of timber and Falling of timber. Dowel and Dowel pins-their shapes and use. Defects in timber; types of knots such as branches knot, dead knot, splay or spike knot and round knot. Alternative method of making a solid pattern and split pattern. Use of dowels and its correct procedure of fixing.
8	Making pattern by buildup construction. Making pattern & core boxes for various types of valves. Pattern and core boxes for bend pipe- 'U' shaped pipe.	Types of glues & uses. Preparation of animal glue. Application of glue. Different types of cores & core boxes-their use and construction technique. Contraction allowances Reading of simple blue in pattern for bronze. prints. Effect of seasoning and properties of timber. Selection of timber for the specific job depending upon size, shape & number of casting required. Finishing pattern as per I. S. I. specifications and colour code. Types of screws & their gauge numbers. Screwing methods; use of different types of screw drivers. Drills; selection of drills according to the screw sizes. Different types of core-boxes - their construction and uses. Various methods of making pattern for their construction, core prints and core boxes.
9	Preparation of pattern of C. I. faces chuck with slots. Pattern of simple hand wheel by the help of lathe. Pattern for C. S. drive sprocket consisting of Segment-Const ruction, Wood turning & taper turning, Core box.	Principles of joints & their uses in pattern making. Different types of face chucks- patterns and their casting. Layout of C.I. bearing stand; Circular saw - its parts, functions, working, adjustment of saw blade, lubrication and maintenance. Layout of hand wheel; use of templates; repair and setting of band saw blade. Description of wood turning lathes-its various parts and their functions & setting of job. Various operations on this machine. Surface planer-its parts and adjustments for carrying out different operations.
10	Use of plaster of parts in making uneven patterns. Pattern with drop and tail core	Plaster of paris-brief description, properties and uses. Types of fillets-leather fillet, use of ply-wood,

	prints.	Grinding machine – parts and functions – grinding, Dressing of grinding wheel & safety precautions. Disk sander machine-its parts and functions, safety precautions of sanding machine; Care and maintenance of the machine. Description of pattern for tail and Drop prints. Different parts of a pulley. Lay out of six arm pulley. Making of templates for segments; cutting of segments. Use of turning machine. Turning & finishing the pattern of pulley.
11	Skeleton pattern of C. I. Bend pipe; making a core box with the help of strickle. Preparation of master pattern Pattern of gear by two methods (a) Core boxes only (b) Pattern only.	Lay out of skeleton bend pipe. Advantages and disadvantages of a skeleton pattern over a solid or split pattern. Method of making core box with strickle. Layout of fly wheel, (making a part pattern instead of whole pat -tern); sweep pattern-its use, parts and advantages, Process of sweep mouling. Layout of master pattern of brass bearing. Principles of master pattern; advantages and uses of master pattern-mass production work-Under taking for double machining contraction allowances. Knowledge of Araldite or plastic pattern. Araldits-Description, Properties & uses. Layout of match plate pattern and description of match plates. Layout of spur-gear, Teeth Calculation. Layout of bevel gear; formula of teeth; common types of gears, construction of gear wheels. Using a jig to form teeth. Method of making chain pulley pattern-Know ledge of chains & pulley.
12	Inspection of pattern and Core boxes. Repairs & maintenance of old patterns.	Inspection-its methods and purpose. Maintenance procedure Estimation of materials. Use of hand book & reference tables.
13	**Revision & Internal Assessment**	

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

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Unit**: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	**Introduction to Engineering Drawing and Drawing Instruments :** - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003 - 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.
2.	**Basic Mathematics -** BODMAS rule Fraction-Addition, Subtraction, multiplication and Division-Problem solving, Decimal-Addition. Simple calculation using Scientific Calculator.	**Lines :** - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
3.	**Conversion** of Fraction to Decimal and vice-versa.	**Free hand drawing of** - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension Transferring measurement from the given object to the free hand sketches.
4.	**Percentage**: Introduction, Simple calculation. Changing percentage to fraction and decimal & vice-versa.	**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.
5.	**Material Science :** Definition, properties (physical & mechanical) and uses of Metal, Non-metal, Alloy &Insulator. Types of ferrous and Non-ferrous metals. Difference between Ferrous and Non-Ferrous metals.	**Sizes and Layout of Drawing Sheets** - Selection of sizes - Title Block, its position and content - Item Reference on Drawing Sheet (Item List)
6.	**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.	**Method of presentation of Engineering Drawing** - Pictorial View - Orthographic View - Isometric view
7.	**Mensuration :** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids – cube, cuboid, cylinder and Sphere. Surface area of solids – cube, cuboid, cylinder and Sphere.	**Drawing of Solid figures** (Cube, Cuboids, Cone) with dimensions.
8.	**Elasticity:** Elastic & Plastic material. Stress & strain and their units. Young's modules. Ultimate stress and breaking stress.	**Free hand Drawing of Solid figures** (Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.
9.	**Heat & Temperature:** Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, Scale of temperature, relation between different scale of temperature. Thermometer, pyrometer. Transmission of heat, conduction, convection, radiation.	**Free Hand sketch** of hand tools and measuring tools used in respective trades.
10.	**Basic Electricity:** Introduction and use of Electricity. AC, DC & their comparisons. Current, Voltage,Resistance& their units. Power, Energy & their units. Insulator and conductors & their uses**.**	**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.
11.	**Drawing of Orthographic projection**	Drawing of Orthographic projection in 3rd angle.

9.2 EMPLOYABILITY SKILLS

(DURATION: 55 HRS.)

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

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

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

10. DETAILS OF COMPETENCIES (ON-JOBTRAINING)

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

Block – I

1. Safety and best practices/Basic Industrial Culture (5S, KAIZEN, etc.)
2. Prepare different types of documentation as per industrial need by different methods of recording information.
3. Prepare patterns of circular from involving turning formation or construction of arms (add and even numbers) building up rims in segmental construction such as hand wheels flanged rims in pulleys rope pulleys.
4. Prepare section or segment core boxes for wheels pulleys for preparing moulds by core assembly.
5. Make the patterns with cover core print such as patterns for piston, elbow with side outlet and their core boxes.
6. Prepare split patterns with non-identical cope and drag parts involving working out curved forms from solid stock such as patterns for lathe tail stock, shackle, pipe vice, bench vice and their core boxes.
7. Finish and paint of patterns as per ISI colour scheme.
8. Make pattern in 'Shell' form involving turning internal, external shapes on curving out by hand tools such as patterns for cylinder head, electric motor side shell C.I. switch box cover.
9. Prepare "Follow board for Shell" form pattern using plaster of paris.
10. Prepare pattern for air chamber and its core model involving turning.
11. Prepare core box for air chamber pattern by joining series of strip (b) using plaster of paris.
12. Make the patterns involving web and rib, construction of thin section such as pattern for J hanger bracket.
13. Prepare patterns and core boxes for various types of valve.
14. Prepare pattern for pipes and their core boxes involving building of stock in stepped form and finishing them such as water jacked pipe and its core boxes.
15. Prepare patterns for pipes and elbows and their core boxes involving staved construction.
16. Make the pattern for gear wheels, sprocket wheels involving turning and formation of teeth.
17. Prepare segment or part core boxes for gear wheel patterns for making moulds by core assembly.

18. Prepare “Master Patterns” for casting metal patterns and core boxes. *
19. Finish cast metal patterns and core boxes by hand tools and machine tools. *
20. Prepare moulds using plaster of paris epoxy resins.*
21. Prepare patterns and core boxes using epoxy resins.*
22. Make the skeleton patterns and core boxes with strickles.
23. Prepare and mount various types of patters on match plates (Wooden and metal) including gating systems.
24. Make the patterns for chills for producing chilled castings.
25. Prepare patterns for core dryers of various forms.
26. Make the different types of production patterns.*
27. Use of production patterns for machine mould.*
28. Perform the various operations on wood working machines used for pattern making.*
29. Inspection of patterns and core boxes.*
30. Inspect of casting/ Dimensional layout of casting. *
31. Repair and maintenance of the patterns and core boxes.*
32. Machine shop observation of various machining operations.*
33. Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.
2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.
3. The operation skills marked (*) are mandatory.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

PATTERN MAKER			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)			
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)			
Sl. no.	**Name of the Tool &Equipments**	**Specification**	**Quantity**
1.	Square try	20 cms.	20
2.	Scriber		20
3.	glinding T-bevel		20
4.	Marking gauge		20
5.	Wing Compass		20
6.	Hand saw	20 cms	20
7.	Tenon saw	30 cms	20
8.	Jack plane (Iron)		20
9.	Smoothing plane (Iron)		20
10.	Mallet with handle		20
11.	Chisel firmer	6 mm. , 12mm. and 25 mm.	20 each
12.	Chisel Mortise	9 mm.	20
13.	Chisel Bradawl		20
14.	Rule contraction in inches & mm		20
15.	Square try	15 cms	20
16.	Caliper	outside 15 cms, spring	20
17.	Caliper	inside 15 cms, spring	20
18.	Dividers	15 cms, spring	20
19.	Punch Centre	10 cms	20
20.	Screw driver	25 cms and 15 cms	20 each
21.	Chisel cold flat	19 mm.	20
22.	File flat rough	25 cms	20
23.	File half round	2nd cut 2 5 cms	20
24.	Rasp	30 cms	20
25.	Hammer ball pein	0. 5 Kg.	20
26.	Hammer warington pattern	224 grams	20
27.	Iron rabbet plane		20
B : Tools, Instruments and General Shop Out fits			
28.	Carpenter's Clario hammer		8
29.	Spirit level	30 cms	4
30.	Glue	2.5 Kg. or 1 Kg.	2
31.	Trying plane		4

32.	Rabbet plane		4
33.	Grooving plane	12 mm, 6 mm.	4 each
34.	Plough plane		4
35.	Firmer Gauge	6 mm., 9 mm., 12 mm. & 19 mm.	4 sets
36.	Brace bits,	12 mm. to 3.75 cms., centre	4 sets
37.	Brace bits	6 mm. to 19 mm by 0. 75 mm. auger bits	2 sets
38.	Auger hand	19 mm., 21 mm.. & 25 mm.	2 sets
39.	Trammel		2 pairs
40.	Spoke shave	44 mm. cutter, round and flat face (Metal)	4 each
41.	Odd leg calipers		4
42.	Oil Stone	20 cms x 5 cms x 2. 5 cms coarse and smooth	8 each
43.	Saw, set, Pistol grip type		2
44.	Mortise gauge		4
45.	Oil can		2
46.	Bench working	245 x 120 x 60 cms	8
47.	Vice, carpenter	30 cms jaw	16
48.	Engineers[1] vice	12 cms Jaws	4
49.	Cramp, carpenter	7. 5 cms.	4
50.	Pincers	15 cms.	16
51.	Ratchet brace		8
52.	Hand drill	6 mm.	4
53.	Stone grinding with through motorised		1
54.	Almirah	180 x 90 x 45 cms.	1
55.	Drill twist	4 mm to 6 mm by 0. 75 mm.	2 sets
56.	Hacksaw frame,	Adjustable for 20 cms	2
57.	Rule 24" two fold brass tipped	In inches and mm	16
58.	Trowel square and heart		4 each
59.	Hammer ball pein	1 Kg. with handle	4
60.	Smoother inside corner		4
61.	Smoother Top edge		4
62.	Smoother egg corner		4
63.	Cleaner		4
64.	Rammer (Pein and flat end)		4
65.	Vent wire		4
66.	Bellows, hand		4
67.	Shovel		4
68.	Shieve	1.5 mm. mesh 40 cms dia	4
69.	Brush,	Soft 25 mm.	4

70.	Brush,	Soft 5 cms.	4
71.	Wooden mallet	15 cms x 6. 25 cms for foundry work	4
72.	Bursh, wire, foundry	18.75 cms x 6. 25 cms.	2
73.	Blow lamp		2
74.	Caliper,	Outside 20 cms.	2
75.	Caliper	Inside 20 cms	2
76.	Chisel, cold,	Flat 2. 5 cms x 22. 5 cms	4
77.	File,	Flat 30 cms.	2
78.	Hammer, sledge,.	Double faced 3.5 Kg	2
79.	Engineer[1] s metal, sprit level		2
80.	Mirror	15 x 10 cms.	4
81.	Box moulding	30 cms square with accessories	4 pairs
82.	Torch, hand, electric		2
83.	Pit, Furnace		2
84.	Goggles		4 pairs
85.	Hand gloves		4 pairs
86.	Desk		1
87.	Table		1
88.	Stool		1
89.	Blackboard with easel		1
90.	Fire extinguisher		1
91.	Fire buckets		4
92.	G cramp	15 cms, Opem's	2
93.	G cramp	20 cms, Opem's	2
94.	Compass saw		4
95.	Key hole saws		2
96.	Block Plane		2
97.	Wood counter sunk	Bits 12 mm.	4
98.	Laddie, carrier		1
99.	Triangular file	17.5 cms slim taper	4
100.	Saw sharpening, vice		2
101.	Nail punch		4
102.	Bevelled edge chisels	2. 5 cm, 19 mm, .12 mm.	2 each
103.	Round file,	Bastard 25 cms.	4
104.	Turning tool	(one set of 6 numbers)	2 sets
105.	Wing compass		8
106.	File brush		4
107.	Lockers	With 8 drawers	1
108.	Crucible. cap with forge	10 Kg	1
109.	Painting tools and brushes		2 sets
110.	Dovetail Saw	20 cms	6 nos
C. General Machinery Shop outfit			

	Band saw	60 cms wheel size	1
	Circular saw	45 cms blade size	1
	Wood turning Lathe with screwed chuck and face plate	120 cms size	1
	Adjustable saw sharpening machine		1
	Disk and hole in sander machine		1
	Surface and thickness planing machine		1
	Bench grinder motorised	D/E **17**. 5 cms Wheel	1

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: PATTERN MAKER

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^o	(250 X 1.5 mm)	20+1 set
3.	Set square celluloid 30^o-60^o	(250 X 1.5 mm)	20+1 set
4.	Mini drafter		20+1 set
5.	Drawing board IS: 1444	(700mm x500 mm)	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.		

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:			

Sl. No	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	Total internal assessment Marks	Result (Y/N)
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														