

Syllabus for the subject

of

**TRADE THEORY-I  
&  
TRADE PRACTICAL-I**

Under

**CRAFT INSTRUCTOR TRAINING SCHEME (CITS)**

**Trade: Foundryman**

Re-Designed in

- 2014 -

By

**Government of India  
Ministry of Labour & Employment  
Directorate General of Employment & Training**

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## **A.RATIONALE**

Success & Sustainability of any Training System depends upon, given other things, availability of good quality instructors. An Instructor should possess good trade skills to impart skill training.

Ability to understand and interpret the course content is imperative to ensure proper delivery. It is the domain Skills and Knowledge which enable comprehending the prescribed contents and subsequent lesson/demonstration planning for effective delivery. Thus it is imperative for any trade instructor to have adequate domain skills so that same can be transferred.

To deliver effectively, both knowledge and skills, in depth know how are very much needed. At the same time the main objective of Instructor training programme is enabling instructors to demonstrate higher productivity and higher accuracy in performing a task/job.

Recognizing this importance more emphasis has been given to the Trade Practical & Trade Theory in all Engineering Trades in Craft Instructors Training Scheme (CITS) under NCVT.

## **B. GENERAL INFORMATION**

1. **Name of the Course** : Craft Instructor Training
2. **Duration of Instructor Training** : 1 Year (Two semesters each of six months duration).
3. **Subjects covered in the Semesters** : Detailed in Section - C
4. **Name of the Subject** : **TRADE THEORY –I & TRADE PRACTICAL-I**
5. **Applicability** : **FOUNDRYMAN TRADE.**
6. **Examination** : AITT to be held at the end of each semester.
7. **Space Norms** :  
(a) One class room of minimum 30 sq. m. area having Minimum width of 5 m. and with 6000 lumen  
(b) Workshop: 120 Sq mtr. having minimum of 8 m. and with 30000 lumen  
**The electrical equipments of Class room should conform to minimum 3 star Building energy rating as per Bureau of Energy Efficiency (B.E.E.).**
8. **Power Norms** :  
(a) 1 KW for Class room  
(b) 11 KW for Workshop.
9. **Unit strength(Batch Size)** : 20
10. **Entry qualification** :  
Diploma/Degree in Mechanical/Production Engineering from AICTE recognized Board / University/ Advance Diploma in Foundry Technology form recognized University.  
OR  
NTC/NAC in the Foundry man trade.
11. **Trainers' Qualification** :  
Diploma or Degree in Mechanical / Production Engineering/Advance Diploma in Foundry Technology from AICTE recognized Board / University with five / two/three year's experience respectively.
12. **Desirable** :  
Passed National Craft Instructor Training course in Foundryman trade.  
  
In case of two units, one trainer must be Degree in Engineering.

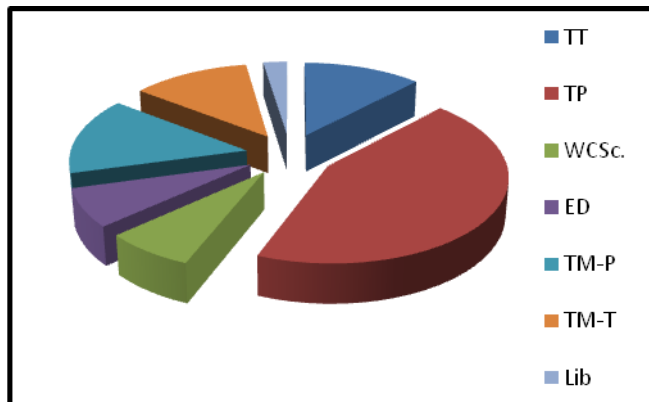
**Note: Degree/Diploma candidate may directly appear for Semester-I exam without attending classes for lateral entry in semester-II.**

### C. SEMESTER WISE ALLOTMENT OF TIME & MARKS AMONG THE SUBJECTS FOR CITS

	SUBJECTS	Hrs. / Week	% of time allotted	Marks	Sessional	Full Marks	Pass Marks		
							Exam.	Sessional	Total
First semester	Trade Practical – 1	20	50	200	30	230	120	18	138
	Trade Theory - 1	6	15	100	20	120	60	12	72
	Workshop Cal. & Sc.	6	15	50	-	50	30	-	30
	Engineering Drawing	6	15	100	-	100	60	-	60
	Library	2	5	-	-				
	<b>TOTAL for Sem. - I</b>	<b>40</b>		<b>450</b>	<b>50</b>	<b>500</b>	<b>270</b>	<b>30</b>	<b>300</b>
Second semester	Trade Practical – 2	16	40	200	30	230	120	18	138
	Trade Theory - 2	4	10	100	20	120	60	12	72
	Training Methodology - Practical	12	30	200	30	230	120	18	138
	Training Methodology - Theory + IT	6+2	20	100	20	120	60	12	72
	<b>TOTAL</b>	<b>40</b>		<b>600</b>	<b>100</b>	<b>700</b>	<b>360</b>	<b>60</b>	<b>420</b>
	<b>GRAND TOTAL</b>	<b>80</b>		<b>1050</b>	<b>150</b>	<b>1200</b>	<b>630</b>	<b>90</b>	<b>720</b>

Hourly Distribution

TOTAL: 1200 marks for 2 semesters Pass marks: 720



Subject	Time in %	Marks in %
Trade Practical	45	38
Trade Theory	12.5	20
<b>Total for Trade</b>	<b>57.5</b>	<b>58</b>
Training Methodology (Practical)	15	19
Training Methodology (Theory) + IT	12.5	10
<b>Total for Training Methodology &amp; IT</b>	<b>27.5</b>	<b>29</b>
Engineering Drawing	7.5	12
Workshop Cal. & Sc.	7.5	4
Library	2.5	-

**D.TOPIC WISE DISTRIBUTION OF TIME & MARKS**  
**TRADE: FOUNDRYMAN**  
**CRAFT INSTRUCTOR TRAINING SCHEME**  
**SEMESTER-I**

Note: During the discussion of any machine tools, related precautions and safety measures should be discussed.

<b>Trade Theory</b>				<b>Trade Practical</b>		
<b>Sl. No.</b>	<b>Topics</b>	<b>Hours</b>	<b>Marks</b>	<b>Topics</b>	<b>Hours</b>	<b>Marks</b>
1	Safety and Health	6	5	Instruction, importance & Familiarization.	20	10
2	Raw materials of Foundry	12	10	Preparation of open & closed mould and melting Aluminium alloy & pouring.	40	20
3	Metal, alloys and its ore.	18	15	Preparation of mould with different joints & with top run gating system.	20	10
4	Moulding and core sands.	12	11	Preparation of mould with bottom and parting line gating system.	40	20
5	Pattern and pattern making	12	11	Core and Core making	40	20
6	Core and Core making	6	6	Preparation of mould with care.	60	25
7	Principle of Gating system.	6	5	Mould preparation with Vertical and Horizontal core.	20	10
8	Fettling, Inspection, Testing, defects & salvaging of casting.	18	12	Mould preparation with balanced and Hanging core.	60	20
9	Heat treatment.	6	5	Preparation of mould with cover core, Ram-up core, chills.	40	20
10	Melting furnaces and practices.	36	20	Melting practice & furnace maintenance.	100	45
	<b>TOTAL</b>	<b>132</b>	<b>100</b>	<b>TOTAL</b>	<b>440</b>	<b>200</b>
	<b>THEORY 1 ---22 WEEKS X 06 HRS/WEEK=132hrs</b>			<b>PRACTICAL 1 ---22 WEEKS X 20 HRS/WEEK=440hrs</b>		

**E. DETAIL SYLLABUS FOR THE TRADE: FOUNDRYMAN**  
**UNDER CRAFT INSTRUCTOR TRAINING SCHEME**  
**SEMESTER-I**

Note: During the discussion of any machine tools, related precautions and safety measures should be discussed.

Tentative Week No.	Theory	Practical
1-2	<p>Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Response to emergencies e.g.; power failure, fire, and system failure</p> <p><b>Soft Skills:</b> its importance and Job area after completion of training.</p> <p><b>Introduction to 5S</b> concept &amp; its application. Importance of 5S implementation throughout CITS course-workplace cleaning, machine cleaning, signage, proper storage of equipment etc.</p> <p><b>Importance of Technical English</b> terms used in industry –(in simple definition only) Technical forms, process charts, activity logs, in required formats of industry, estimation, cycle time, productivity reports, job cards.</p> <p><b>Basic Life support (BLS):-</b></p> <p>Basic Life Support (BLS) techniques for drowning, choking, electrocution, neck and spinal injury, including CPR (cardiopulmonary resuscitation).</p> <p>Safety Precaution to be Followed While Under gone Through Various foundry operation.</p>	<p><b>Occupational Safety &amp; Health</b></p> <p><b>Importance of housekeeping &amp; good shop floor practices.</b></p> <p>Health, Safety and Environment guidelines, legislations &amp; regulations as applicable. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Basic safety introduction,</p> <p>Personal protective Equipments(PPE):-</p> <p>Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution &amp; personal safety message.</p> <p>Preventive measures for electrical accidents &amp; steps to be taken in such accidents.</p> <p>Use of Fire extinguishers.</p> <p><b>Technical English:</b></p> <p>Prepare different types of documentation as per industrial need by different methods of recording information.</p> <p><b>Basic Life support training:</b></p> <p>Be able to perform DRSABCD:</p> <p>D: Check for Danger</p> <p>R: Check for a Response</p> <p>S: Send for help</p> <p>A: Open the Airway</p> <p>B: Check for normal Breathing</p> <p>C: Perform CPR (Cardio Pulmonary Resuscitation)</p>

		D: Attach Defibrillator / Monitor as soon as available. Importance of trade training. Machinery used in the trade as well as Industries.
2-3	Foundry materials: Classification, Application, & I.S.I Specification for all Raw Materials Used in Foundry. Refractory sand, Refractories, Binder, Fuels, Fluxes, Facing materials, Parting agents	Preparation of open sand mold by trammeling method, apply facing & backing sand for C.I casting. Preparation of closed mold with Natural molding sand, melting of Al. Alloys in Crucible furnace and pouring the same in to the molds. Carry all types of sand tests
4	Engineering metals. Classification of Metals. (Ferrous, Non-Ferrous & Its Alloys. Ore to Metal Mfg. Of Ferrous Metals, Properties, Application I.S.I Specification. Effects Of elements normally Presents in Ferrous Metals. Effects of alloying elements in Cast Iron alloys and Steel Alloys	Preparation of mold with different Joints (plain, Build up, Cutting, Floating). Preparation of mold with Top Run gating system.
5-6	Engineering metals. Ore to Metal Mfg.Of Non-Ferrous Metals, Properties Application I.S.I Specification	Preparation of mold with Bottom Run gating System. Preparations of mold with Parting Line run gating system
7-8	Molding Sand & core sand. Composition, Types, Ingredients, additives. Properties of sand. Sand reclamation and Sand Preparation.	Preparation of Different types of Core by using different types of Core Boxes, and making of core by different types of Core Binder and also baking then in Oven and other Methods.
9-11	Design of casting Introduction Sand casting , Pattern: Types, materials, Allowance, Color coding, Care & maintenance. Core Boxes: Types, Materials, coloring. Core: Classification of core. Venting & Reinforcing, Backing & Baking of core.	Preparation of mold with core; by using of self cored pattern and split pattern having Horizontal & Vertical Core print. Preparation of core sand, preparation of core, Reinforcement and Venting of core. Backing & Baking of core, trimming of core & dressing of core.
12	Gating system: Introduction, Parts & Function, Types, Pre-Requisites, Ferro static Pressure	Preparation of mold with odd side pattern, setting of Vertical core and Horizontal cores in a mold
13-14	Fettling: Fettle the all types of Casting, Mould Shake out-removal of runner & Riser, Surface cleaning, Finishing & Trimming. Inspection of Casting: Destructive and Non-Destructive methods, Casting Defects: Internal & External Defects. Salvaging of Castings: Foundry method, By welding methods.	Preparation of mold with balanced core & Hanging Core, setting with Chaplet in to a mold, along with suitable gating system.



15-16	Introduction of heat treatment. Different type of heat treatment. Heat Treatment in different metals and its alloy. Difference type of heat chamber	Preparation of mold with Cover core & Ram up Core, Setting the core into a molds with suitable Gating system
17-20	Different type of coolant. Iron-carbon diagram, TTT, CCT diagram. Furnace. Brief Information about the Construction, operation, Maintenance & Turbule Shooting of Melting Furnace. (solid-Liquid-Gas-Electrical Fuel) I. Cast Iron Melting- Cupola, Rotary Furnace, Electrical Arc Furnace. II. Steel Melting- Electric Arc & Induction Furnace – Types, construction, operation, and maintenance, Converter. II. Non-ferrous metal melting. Crucible Furnace, Pot furnace, Reverberatory furnace, Rotary furnace, Induction furnace Charging the Metals & Chemical analysis. Measure Molten Metal Temperature by Using Of Pyrometers: Introduction, Necessity, Thermocouple, Pyrometer, Optical Pyrometer, Radiation Pyrometer, Infrared Thermograph	Preparation of Mold with Chill or Denseners, setting the core into a mold, along with suitable gating system.(use chill, denseners, Exo- thermic materials).  Prepare induction furnace for charging, Prepare charges for charging, operate and melt aluminium/ magnesium and pour aluminium/ magnesium into the mould and identify defects.
21-22	Furnace: Modern developments of Cupola. (Coke less cupola, Hot blast cupola, Dived blast cupola.)	Reeling of Furnace. Relining and Patching of Tilting / Pit furnace, Preparation of Ladle lining by Fire clay mixture and C02 sand
23	<b>Industrial visit &amp; Submission of Report</b>	
24 - 26	<b>Revision &amp; Trade Test</b>	

## **F. List of Tools & Equipment**

**Trade – FOUNDRYMAN**  
**Under CITS**  
**For a batch of 20 Trainees**  
**Semester-I**

<b>SL. No.</b>	<b>Name of the tools and equipment</b>	<b>Qty per unit</b>
1.	Tool tray steel 145x145x5 cm	20+1
2.	Taper trowel 18cm round	20+1
3.	Heart and square trowels <b>3xl.2xl.2cm</b>	20+1
4.	Trowel heart and scoop	20+1
5.	Trowel square and scoop	20+1
6.	Trowel double scoop	20+1
7.	Trowel double square	20+1
8.	Tool Spoon 32x16cm -25x6cm	20+1
9.	Cleaner 6x300m	20+1
10.	Cleaner 9x300m	20+1
11.	Vent wire 3mm	20+1
12.	Peg Rammer	20+1
13.	Flat rammer 75mmx25mm height	20+1
14.	Rapping spike forged and hardened	20+1
15.	Hand bellows -25cm	20+1
16.	Safety goggles (With clear glass )	20+1
17.	Goggles (antiglau heat proof)	20+1
18.	Cleaner flange	20+1
19.	Egg smoother	20+1
20.	Smoother rounder corner	20+1
21.	Smoother square corner	20+1
22.	Steel rule 300mm	20+1
23.	Apron leather or asbestos	20+1
24.	Legging pad	20+1
25.	Hand gloves (Leather or asbestos)	20+1

## TOOLS, MEASURING INSTRUMENTS AND SHOP OUTFIT

SL. NO	ITEMS	QTY
1.	Hammers Ball Peen 0.45kg.	10
2.	Ball Peen Hammers 650 to 700 grams	10
3.	Sledge Hammers 8kg	5
4.	Claw Hammers 0.75kg	2
5.	Chisel Cold Flat 2 x 22 cm	10
6.	Chisel 200 x 15 mm	10
7.	File flat 30 cm Bastared	10
8.	File flat 30 cm second cut	10
9.	File flat round 30cm Bastard	10
10.	File flat 30 cm second cut	10
11.	Folding rule 60 cm	5
12.	Steel rule 600 mm	5
13.	Caliper odd leg	3
14.	Caliper inside 15cm	5
15.	Scriber	5
16.	Centre Punch 15cm	5
17.	Hacksaw 30cm adjustable	10
18.	C Clamps 20 cm	10
19.	C Clamps 30 cm light duty steel	10
20.	Screw Drivers 25 cm with 15mm blade	5
21.	Screw Drivers 15 cm	5
22.	Screw Drivers 18 cm	5
23.	Pliers 20 cm	5
24.	Try Square (for wood work)	5
25.	Brick layers hammer 20cm	5
26.	Hand lamp wandering lead	2
27.	Degassing bale 10 cm Perforated hood	2
28.	Bench Vice 12 cm jaw	5
29.	Work bench for bench vice (245 x 125x 75)	1
30.	Blow lamp (gas)	5
31.	Hand saw	5
32.	Steel measuring tap 3 mts.	1
33.	Trammel	2
34.	Shovel Hand	10
35.	Engineers Try Square 15 cm	5
36.	Lockers Steel with 8 drawers each	3
37.	Black board with easel	1
38.	Fire Extinguishers foam chemical type	2
39.	Fire Extinguishers soda Ash, etc type Co2 gas type	1 each
40.	Fire buckets (2 for water and 3 for sand)	5

<b>SL. NO</b>	<b>ITEMS</b>	<b>QTY</b>
41.	Stand for Fire buckets	1
42.	Face shield clear	10 pair
43.	Helmet (engineers)	10 pair
44.	Gauntlets leather Fettling	10 pair
45.	Gauntlets leather or asbestos for Furnace	10 pair
46.	Footwear asbestos over shoes	10 pair
47.	First aid Box based on burn Treatment	1 set
48.	Dividers Firm joint 20 cm	5
49.	Moulding Boxes 30 x 40 x 15 cm RSDL	20 pair
50.	Moulding Boxes 75 x75 x 25cm RSDL	10 pair
51.	Snap Flask 40 x 35 x 12 cm RSDL	2 Pair
52.	Snap Flask 30 x30 x 10 cm RSDL	2pair
53.	Sprit level	5nos
54.	Wheel barrows	2nos
55.	Plane grooving 6mm cutter	2nos
56.	Cutting Pliers	2nos
57.	Set of Spanners , and Alegen keys	2 set each
58.	Venire calipers	1no.
59.	Set of Tongs For Melting & Charging.	2sets
60.	Equipment for conducting BLS (Basic Life Saving) training.	1 set

## LIST OF EQUIPMENTS AND GENERAL MACHINERY

SL. NO:	NAME OF EQUIPMENT	QUANTIT Y
1	Air Compressor with maximum working pressure of 17.5kg/sq.cm	2.nos
2	Pneumatic Rammer with Rubber head	2.nos
3	Pneumatic Chisel (with suitable Chisel)	1.no
4	Molding Sand Mix, Molding Sand Muller 50kg capacity per minute	Each one unit
5	Mould Green Hardness tester - dial type -Risdale dials standard	1 no
6	Core hardness tester	1 no
7	L.P.G Cylinder With heating torch (Industrial Purpose)	1 no
9	Heating and Plumbing Unit to suit to oil Fired Tilting type Crucible Furnace with Heating Pressure Gauge etc. Oil tank Motorized Rotary pump-Pre heater.	1.unit
10	Sand testing Equipments - Permeability meter, Universal Strength tester, Sieve Shaker, standard Sand Rammer, Shutter Index Tester, Clay Content Tester, Speedy Moisture teller. Electric Hot Air oven.	Each One Set
11	Molding Machine Hand squeeze With Stripping device pin lift type. ( latest version ) With Suitable Compressor & Lifting Device.	One unit
12	Sand Aerator.	One unit
13	Testing Of Mechanical Properties: Tensile Tester, Hardness Tester, The brinell Tester, The Rockwell Tester, Fracture Tester, Impact Tester, Creep tester. Specification: Equipments suitable for Training Purposes.	Each one unit
14	Electrical Melting Furnace: Induction 100 kg. melting of C.I or Steel or Brass. With all accessories.	one unit
15	Metal Chemical Composition Analyzers or spectrometer	one unit
16	Heat -Treated Furnace ( Electrical Furnace)	One Unit
17	Equipment for conducting BLS (Basic Life Support) training. (Optional)	1 set

Syllabus for the subject

Of

**TRADE THEORY-II  
&  
TRADE PRACTICAL-II**

Under

**CRAFT INSTRUCTOR TRAINING SCHEME (CITS)**

**Trade: Foundryman**

Re-Designed in

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**Government of India  
Ministry of Labour & Employment  
Directorate General of Employment & Training**

## **G. GENERAL INFORMATION**

- 1. Name of the Course** : Craft Instructor Training
- 2. Duration of Instructor Training** : 1 Year (Two semesters each of six months duration).
- 3. Subjects covered in the Semesters** : Detailed in Section - C
- 4. Name of the Subject** : **TRADE THEORY –II & TRADE PRACTICAL-II**
- 5. Applicability** : **FOUNDRYMAN TRADE**
  
- 6. Examination** : AITT to be held at the end of each semester.
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(a) One class room of minimum 30 sq. m. area having Minimum width of 5 m. and with 6000 lumen  
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- 8. Power Norms** :  
(a) 1 KW for Class room  
(b) 11 KW for Workshop.
  
- 9. Unit strength(Batch Size)** : 20
  
- 10. Entry qualification** : Candidate passed semester-I under CITS or completed Semester-I.
  
- 12. Trainers' Qualification** : Diploma or Degree in Mechanical / Production Engineering/ Advance Diploma in Foundry Technology from AICTE recognized Board / University with five / two/three years experience respectively.
- 13. Desirable** : Passed National Craft Instructor Training course in Foundryman trade.  
  
In case of two units, one trainer must be Degree in Engineering.





**I. DETAIL SYLLABUS FOR THE TRADE: FOUNDRYMAN**  
**UNDER CRAFT INSTRUCTOR TRAINING SCHEME**  
**SEMESTER-II**

Note: During the discussion of any machine tools, related precautions and safety measures should be discussed.

<b>Tentative Week No.</b>	<b>Theory</b>	<b>Practical</b>
1-2	Brief Information about Modern /All types of Moulding and Core Making Machines. Molding Machines, Introduction, Functions, Advantages, Disadvantages, Types. Core Making Machines, Introduction, Functions, Advantages, Disadvantages, Types.	Preparation of mold by molding Machine. (Hand molding machine & use of Special tools). Preparation of Core by Core Shooters.
3-5	Special Casting Process: Detailed information about the Special Casting Process. Including a II types of DIE Casting. Introduction-Classification-Advantages-Disadvantages - Application. (Metal Mould Casting, Gravity Die casting, Pressure Die Casting, Centrifugal casting, Slush casting) Non-Metal Mould casting. Carbon dioxide molding, Shell Molding, Lost Wax Process, Plaster Mould, Binder less dry sand process. Etc.	Preparation of mold with Stack molding methods.
6-7	Detailed Information about Lay-out of different Foundries. Foundry Mechanization, Construction, Merit of Modernization, Application. (Materials Handling Equipment-Industrial Trucks- Cranes- Hoists-Conveyors- Slides and Chutes -Tractors and Trailers-Robots).	Preparation of Special mold by Full mold process. ( use of expanded polystyrene / Thermo Cole pattern
8	Introduction to Inspection and Testing Procedures - Visual Inspection, Dimensional Inspection, Examination of Surface	Preparation of mold and core by air setting binders

	Quality And Finish,	
9-10	Sound Test, Pressure Testing \ Leak Testing, Testing Of Mechanical Properties: Tensile Testing Hardness Testing The brinell Test or The Rockwell Test, Fracture Test, Impact Test, Creep Testing.	Preparation of mold and core flask less system, No-bake system
11-12	Heat-Treated all Types of Metal Casting and Salvaging of Metallurgical Problems	Preparation of mould & core by Co2 Process.
13-14	NON- DESTRUCTIVE TEST: Introduction, Radiography, (X-ray & y- ray) Magnetic Particle Inspection, Fluorescent - Penetrate Inspection. Ultrasonic Inspection.	Preparation of mold & core by Shell molding Process
15-16	SOME ADVANCEMENTS IN INSPECTION AND TESTING Instrumented Impact Testing, Thermal Inspection, X-Ray Diffraction Analysis, Materials Characterization Automation of Surface Defect Detection, Image Analysis, Industrial Computed Tomography, Computerized Testing	Preparation of mold with Special molding Process like INVESTMENT CASTING process.
17-18	THE USE OF STATISTICAL METHODS IN QUALITY CONTROL OF CASTING. (a)Sampling Inspection, (b)Control Charts. Design of new casting Software package for the design and production of casting. Program Structure the knowledge-base-Parting line analysis Feeder head design Gating design- Pattern plate layout concluding.	Preparation of a solid casting & Hollow Casting by using of Gravity Die casting Machine
19-20	Energy Conservation and Environment Control. Energy conservation in Melting, & Casting, Heat-Treatment. Energy saving, Environmental pollution in foundries and its control. Cost and Estimation of Casting. Casting weight calculation	Preparation of a Solid Casting & Hollow casting by using of Pressure Die Casting Machine.
21-22	QUALITY CONTRAL IN FOUNDRIES: Introduction,	Preparation of Casting by Centrifugal casting Machine

	Quality Control In Pattern And Mold Making, QUALITY Control In Melting, Quality Control in Heat-treatment, Quality Control in Fettling and Cleaning, Quality Control in Final Inspection, Dust control in foundries.	
23	<b>Industrial visit &amp; Submission of Report</b>	
24 - 26	<b>Revision &amp; Trade Test</b>	

**J. List of Tools & Equipment**  
**For a batch of 20 Trainees for the trade of – FOUNDRYMAN**  
**Under Craft Instructors Training Scheme**  
**Semester-II**

SL. No.	Name of the tools and equipment	Qty per unit
1.	Tool tray steel 145x145x5 cm	20+1
2.	Taper trowel 18cm round	20+1
3.	Heart and square trowels <b>3xl.2xl.2cm</b>	20+1
4.	Trowel heart and scoop	20+1
5.	Trowel square and scoop	20+1
6.	Trowel double scoop	20+1
7.	Trowel double square	20+1
8.	Tool Spoon 32x16cm -25x6cm	20+1
9.	Cleaner 6x300m	20+1
10.	Cleaner 9x300m	20+1
11.	Vent wire 3mm	20+1
12.	Peg Rammer	20+1
13.	Flat rammer 75mmx25mm height	20+1
14.	Rapping spike forged and hardened	20+1
15.	Hand bellow -25cm	20+1
16.	Safety goggles (With clear glass )	20+1
17.	Goggles (antiglau heat proof)	20+1
18.	Cleaner flange	20+1
19.	Egg smoother	20+1
20.	Smoother rounder corner	20+1
21.	Smoother square corner	20+1
22.	Steel rule 300mm	20+1
23.	Apron leather or asbestos	20+1
24.	Legging pad	20+1
25.	Hand gloves (Leather or asbestos)	20+1

## TOOLS, MEASURING INSTRUMENTS AND SHOP OUTFIT

SL. NO	ITEMS	QTY
1.	Hammers Ball Peen 0.45kg.	10
2.	Ball Peen Hammers 650 to 700 grams	10
3.	Sledge Hammers 8kg	5
4.	Claw Hammers 0.75kg	2
5.	Chisel Cold Flat 2 x 22 cm	10
6.	Chisel 200 x 15 mm	10
7.	File flat 30 cm Bastard	10
8.	File flat 30 cm second cut	10
9.	File flat round 30cm Bastard	10
10.	File flat 30 cm second cut	10
11.	Folding rule 60 cm	5
12.	Steel rule 600 mm	5
13.	Caliper odd leg	3
14.	Caliper inside 15cm	5
15.	Scriber	5
16.	Centre Punch 15cm	5
17.	Hacksaw 30cm adjustable	10
18.	C Clamps 20 cm	10
19.	C Clamps 30 cm light duty steel	10
20.	Screw Drivers 25 cm with 15mm blade	5
21.	Screw Drivers 15 cm	5
22.	Screw Drivers 18 cm	5
23.	Pliers 20 cm	5
24.	Try Square (for wood work)	5
25.	Brick layers hammer 20cm	5
26.	Hand lamp wandering lead	2
27.	Degassing bale 10 cm Perforated hood	2
28.	Bench Vice 12 cm jaw	5
29.	Work bench for bench vice (245 x 125x 75)	1
30.	Blow lamp (gas)	5
31.	Hand saw	5
32.	Steel measuring tap 3 mts.	1
33.	Trammel	2
34.	Shovel Hand	10
35.	Engineers Try Square 15 cm	5
36.	Lockers Steel with 8 drawers each	3
37.	Black board with easel	1
38.	Fire Extinguishers foam chemical type	2
39.	Fire Extinguishers soda Ash, etc type Co2 gas type	1 each
40.	Fire buckets (2 for water and 3 for sand)	5

<b>SL. NO</b>	<b>ITEMS</b>	<b>QTY</b>
41.	Stand for Fire buckets	1
42.	Face shield clear	10 pair
43.	Helmet (engineers)	10 pair
44.	Gauntlets leather Fettling	10 pair
45.	Gauntlets leather or asbestos for Furnace	10 pair
46.	Footwear asbestos over shoes	10 pair
47.	First aid Box based on burn Treatment	1 set
48.	Dividers Firm joint 20 cm	5
49.	Moulding Boxes 30 x 40 x 15 cm RSDL	20 pair
50.	Moulding Boxes 75 x75 x 25cm RSDL	10 pair
51.	Snap Flask 40 x 35 x 12 cm RSDL	2 Pair
52.	Snap Flask 30 x30 x 10 cm RSDL	2pair
53.	Sprit level	5nos
54.	Wheel barrows	2nos
55.	Plane grooving 6mm cutter	2nos
56.	Cutting Pliers	2nos
57.	Set of Spanners , and Alegen keys	2 set each
58.	Venire calipers	
59.	Set of Tongs For Melting & Charging.	

## LIST OF EQUIPMENTS IN GENERAL INSTALLATION

SL. NO:	NAME OF EQUIPMENT	QUANTIT Y
1	Air Compressor with maximum working pressure of 17.5kg/sq.cm	2.nos
2	Pneumatic Rammer with Rubber head	2.nos
3	Pneumatic Chisel (with suitable Chisel)	1. no
4	Molding Sand Mix, Molding Sand Muller 50kg capacity per minute	Each one unit
5	Mould Green Hardness tester - dial type -Risdale dials standard	1 no
6	Core hardness tester	1 no
7	Co2 Cylinder with Co2 probe and rubber hoses with nozzle 12mm wheel valve.	1 no
8	L.P.G Cylinder With heating torch (Industrial Purpose)	1 no
9	Cylinder trolley Suitable to Co2 Cylinder and Indane/similar Gas Cylinder	2 no
10	Heating and Plumbing Unit to suit to oil Fired Tilting type Crucible Furnace with Heating Pressure Gauge etc. Oil tank Motorized Rotary pump-Pre heater.	1. unit
11	Sand testing Equipments - Permeability meter, Universal Strength tester, Sieve Shaker, standard Sand Rammer, Shutter Index Tester, Clay Content Tester, Speedy Moisture teller. Electric Hot Air oven.	Each One Set
12	Molding Machine Hand squeeze With Stripping device pin lift type. ( latest version ) With Suitable Compressor & Lifting Device.	One unit
13	Sand Aerator.	One unit
14	Testing Of Mechanical Properties: Tensile Tester, Hardness Tester, The brinell Tester, The Rockwell Tester, Fracture Tester, Impact Tester, Creep tester. Specification: Equipments suitable for Training Purposes.	Each one unit
15	NON- DESTRUCTIVE TEST: Radiography, (X-ray & y- ray) Magnetic Particle Detector, Dye Fluorescent -Dye Penetrants Detector, Ultrasonic Flaw Detector, Specification: Equipments suitable for Training Purposes.	Each one unit
16	Metal Chemical Composition Analyzers / Spectrometer	Each one unit
17	Heat -Treated Furnace ( Electrical Furnace)	One Unit

**K. FURNITURE, ACCESSORIES AND AUDIO VISUAL AIDS FOR  
THE SEMESTER-I & II (COMMON FOR ALL ENGG. TRADES)**

<b>Sl. No.</b>	<b>Items</b>	<b>Qnt.</b>
1.	Class Room Chairs (armless) / Dual desk may also be allowed	20 /10nos.
2.	Class Room Tables ( 3ft X 2ft) / Dual desk may also be allowed	20 /10nos.
3.	Chair for Trainer (armed) movable	01 no.
4.	Table for Trainer (4 ½ ft X 2 ½ ft) with Drawer and cupboard	01 no.
5.	LCD / LED Projector	01 no.
6.	Multimedia Computer System with all accessories with UPS (.5 KVA)	01 set
7.	Computer Table	01 no.
8.	White Board (6ft X 4 ft.)	01 no.
9.	LCD Projector Screen	01 no.
10.	Air Conditioner 1.5Ton (OPTIONAL)	02 nos.
11.	Wall Clock	01 no.
12.	Wall charts, Transparencies and DVDs related to the trade	As required
13.	Laser Printer with scanner	01
14.	Steel Cupboard with 8 pigeon lockers	3 nos.
15.	Work bench for fitters with two vices of 100mm	2 nos.
16.	Steel cupboard 180x90x45cm	2 nos.
17.	Steel cupboard 120x60x45cm	2 nos.
18.	Multi drawer tool rack trolley with minimum 4 drawers and 20 tool capacity	04 nos.
19.	First aid box.	01 no.



## L. LIST OF TRADE COMMITTEE MEMBERS

Sl. No.	Name & Designation Sh/Mr/Ms.	Organization	Mentor Council Designation
<b>Members of Sector Mentor council</b>			
1.	A. D. Shahane, Vice-President, (Corporate Trg.)	Larsen & Tourbo Ltd., Mumbai:400001	Chairman
2.	Dr. P.K.Jain, Professor	IIT, Roorkee, Roorkee-247667, Uttarakhand	Member
3.	N. Ramakrishnan, Professor	IIT Gandhinagar, Gujarat-382424	Member
4.	Dr. P.V.Rao, Professor	IIT Delhi, New Delhi-110016	Member
5.	Dr. Debdas Roy, Asstt. Professor	NIFFT, Hatia, Ranchi-834003, Jharkhand	Member
6.	Dr. Anil Kumar Singh, Professor	NIFFT, Hatia, Ranchi-834003, Jharkhand	Member
7.	Dr. P.P.Bandyopadhyay Professor	IIT Kharagpur, Kharagpur- 721302, West Bengal	Member
8.	Dr. P.K.Ray, Professor	IIT Kharagpur, Kharagpur- 721302, West Bengal	Member
9.	S. S. Maity, MD	Central Tool Room & Training Centre (CTTC), Bhubaneswar	Member
10.	Dr. Ramesh Babu N, Professor	IIT Madras, Chennai	Member
11.	R.K. Sridharan, Manager/HRDC	Bharat Heavy Electricals Ltd, Ranipet, Tamil Nadu	Member
12.	N. Krishna Murthy Principal Scientific Officer	CQA(Heavy Vehicles), DGQA, Chennai, Tamil Nadu	Member
13.	Sunil Khodke Training Manager	Bobst India Pvt. Ltd., Pune	Member
14.	Ajay Dhuri	TATA Motors, Pune	Member
15.	Uday Apte	TATA Motors, Pune	Member
16.	H B Jagadeesh, Sr. Manager	HMT, Bengaluru	Member
17.	K Venugopal Director & COO	NTTF, Peenya, Bengaluru	Member
18.	B.A.Damahe, Principal L&T Institute of Technology	L&T Institute of Technology, Mumbai	Member
19.	Lakshmanan. R Senior Manager	BOSCH Ltd., Bengaluru	Member
20.	R C Agnihotri Principal	Indo- Swiss Training Centre Chandigarh, 160030	Member
<b>Mentor</b>			
21.	Sunil Kumar Gupta (Director)	DGET HQ, New Delhi.	Mentor

<b>Members of Core Group</b>			
22.	N. Nath. (ADT)	CSTARI, Kolkata	Co-ordinator
23.	H.Charles (TO)	NIMI, Chennai.	Member
24.	Sukhdev Singh (JDT)	ATI Kanpur	Team Leader
25.	Ravi Pandey (V.I)	ATI Kanpur	Member
26.	A.K. Nasakar (T.O)	ATI Kolkata	Member
27.	Samir Sarkar (T.O)	ATI Kolkata	Member
28.	J. Ram Eswara Rao (T.O)	RDAT Hyderabad	Member
29.	T.G. Kadam (T.O)	ATI Mumbai	Member
30.	K. Mahendar (DDT)	ATI Chennai	Member
31.	Shrikant S Sonnavane (T.O)	ATI Mumbai	Member
32.	K. Nagasrinivas (DDT)	ATI Hyderabad	Member
33.	G.N. Eswarappa (DDT)	FTI Bangalore	Member
34.	G. Govindan, Sr. Draughtsman	ATI Chennai	Member
35.	M.N.Renukaradhya, Dy.Director/Principal Grade I.,	Govt. ITI, Tumkur Road, Banglore, Karnataka	Member
36.	B.V.Venkatesh Reddy. JTO	Govt. ITI, Tumkur Road, Banglore, Karnataka	Member
37.	N.M.Kajale, Principal,	Govt. ITI Velhe, Distt: Pune, Maharashtra	Member
38.	Subrata Polley, Instructor	ITI Howrah Homes, West Bengal	Member
39.	VINOD KUMAR.R Sr.Instructor	Govt. ITI Dhanuvachapuram Trivendrum, Dist., Kerala	Member
40.	M. Anbalagan, B.E., Assistant Training Officer	Govt. ITI Coimbatore, Tamil Nadu	Member
41.	K. Lakshmi Narayanan, T.O.	DET, Tamil Nadu	Member
<b>Other industry representatives</b>			
42.	Venugopal Parvatikar	Skill Sonics, Bangalore	Member
43.	Venkata Dasari	Skill Sonics, Bangalore	Member
44.	Srihari, D	CADEM Tech. Pvt. Ltd., Bengaluru	Member
45.	Dasarathi.G.V.	CADEM Tech. Pvt. Ltd., Bengaluru	Member
46.	L.R.S.Mani	Ohm Shakti Industries, Bengaluru	Member