CURRICULUM

FOR THE TRADE OF

PAINTER (GENERAL)

UNDER

APPRENTICESHIP TRAINING SCHEME

सत्यमेव जयते
Government of India

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

CONTENTS

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2. Tata Motors Limited, Chinhat Industrial Area, Lucknow, U.P..
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Special acknowledgement is expended by DGT to the following expert members who had contributed immensely in this curriculum.

Co-ordinator for the course : R.N.MANNA, Training Officer, CSTARI, Kolkata

Sl. No.	Name & Designation Sh./Mr./Ms.	Organization	Remarks
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2. BACKGROUND

2.1 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.

2.2 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.

2.3 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.

3. RATIONALE

(Need for Apprenticeship in PAINTER -GENERAL trade)

A Unique Training Process

The Apprenticeship system of training is unique in that it is the only formal, structured, and nationally recognized education and training program available that combines the two most common forms of career and occupational learning: classroom instruction with on-the-job training.

Apprentices not only learn occupational skills in the classroom, their learning is expanded to include hands-on, paid, on-the-job training. Students learn and practice all phases of the trade/occupation in real-world applications.

Apprenticeship is a training strategy that, leads to a certificate of completion and nationally recognized skilled worker status. These credentials have explicit meaning, recognition, and respect in the eyes of Central and State Governments and relevant Industries.

The Apprenticeship Programs train men and women to craftsman status. By participating in a program, apprenticeship training shape applicants with character, aptitude, motivation and good personality traits into competent Craftsmen and Craftswomen who have in-demand skill sets, comprehensive knowledge, positive attitudes and superior abilities.

Industry has grown many folds since independence. For matching skill requirement, industry require skilled painter to ensure repeatability of process from one job to another as by nature it is process work. Paint shop people expect following from painter general trade: -

I. Knowledge about Painting process , Painting booth, Paint mixing system and Parameter setting.
II. Able to do prepare metal surface for painting application and do painting on Parts repeatedly as per Lay down specification.
III. Able to do sealant application on metal surface.
IV. Able to identify paint defect and find out cause of it and do rectification.

Painting is the protection and decorative related activity. Finally, manufactured equipment will expose to the different temperatures, different climatic conditions. Painting gives long durability for surface protection. Along with protection it gives decorative and aesthetic look also.

The Apprenticeship painter would have the knowledge related to the above factors. Hence, it is very much necessary and relevant for the Painter.

4. JOB ROLES: REFERENCE NCO

Brief description of Job roles:

7142.10 Painter, General applies decorative or protective coats of paint, varnish, shellack, enamel, lacquer or other materials on exterior or interior surfaces, trimming and fixtures of glass, metal, wood, plaster concrete brick, building boards or other objects using brush, spray gun, roller, stencils etc. Receives work order and selects correct type of paint materials with the consideration to suitability, durability, ease of application and estimated cost. Mixes pigments, oils and other ingredients to material where required by manual or mechanical mixing device using paddle or electric mixer to obtain desired colour, shade and consistency. Removes dirt, grease or rough spots and irregularities by scrapers, chemicals and abrasives and patches cracks and holes with putty or other filler. Covers surface with appropriate prime coat or sealer to have suitable surface or base for paint. Brushes, sprays or stencils one or more coats of material on surfaces. May finish or decorate surfaces by gilding, silvering or painting over stencils. May be designated according to object coated or material used. May mix paint with linseed oil, colouring matter of materials, labour, etc. May erect scaffolds to facilitate work.

Reference NCO: **2004 / 7142.10**

5. GENERAL INFORMATION

1. **Name of the Trade** **: PAINTER (GENERAL)**

2. **N.C.O. Code No.** : 2004 / 7142.10

3. **Duration of Apprenticeship Training (Basic Training + Practical Training):** 2years

3.1 **For Freshers :- Duration of Basic Training**: -

a) Block –I : 3 months

b) Block – II : 3 months

Total duration of Basic Training: 6 months

Duration of Practical Training (On -job Training): -

a) Block–I: 9 months

b) Block–II : 9 months

Total duration of Practical Training: 18 months

3.2 **For ITI Passed :- Duration of Basic Training**: - NIL

Duration of Practical Training (On -job Training): 12 months

4. **Entry Qualification** : Passed 8th class examination or its equivalent

5. **Selection of Apprentices:** The apprentices will be selected as per Apprentices Act amended time to time.

6. Rebate to ITI Passed out Trainees : one year for the trade of **PAINTER (GENERAL).**

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.

6. COURSE STRUCTURE

Training duration details: -

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

Components of Training	Duration of Training in Months																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Basic Training Block - I																								
Practical Training Block - I																								
Basic Training Block - II																								
Practical Training Block - II																								

7. SYLLABUS

7.1 BASIC TRAINING
(BLOCK – I & II)
DURATION: 06 MONTHS

GENERAL INFORMATION

1) **Name of the Trade** : **PAINTER (GENERAL)**
2) **Hours of Instruction** : 1000 Hrs. (500 hrs. in each block)
3) **Batch size** : 16
4) **Power Norms** : 2 KW for Workshop
5) **Space Norms** : 56Sq.mT.
6) **Examination** : The internal assessment will be held on completion of each Block.
7) **Instructor Qualification** :

i) Degree/Diploma in **PRODUCTION / CHEMICAL Engg.** from recognized university/Board with one/two year post qualification experience respectively in the relevant field.

OR

ii) NTC/NAC in the trade of **PAINTER (GENERAL)** with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

8) **Tools, Equipments & Machinery required** : - As per Annexure – I

7.1.1 DETAIL SYLLABUS OF CORE SKILL

A. Block– I
Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1	Freehand sketching of straight lines, rectangles, squares, circles, polygons etc. Free hand writing practice of letters and numbers.	**30**	Applied workshop problem involving Multiplication & division common Fractions addition, subtraction, Multiplication & division application of fraction to shop problems.	**20**
2	Free hand sketching of tools used in the trade		Calculate area of rectangle, squares, triangles, circle, regular polygons, rectangular block, cubical block, cylinder, cone, sphere, pyramid etc.	
3	Geometrical Construction of figures-triangles, square, hexagon, Octagon, circles, ellipses etc. & dividing of lines, angles into equal parts, tangent to a curve -using drawing instruments.		Calculate volume of rectangular block, cubical block, cylinder, cone, sphere, pyramid etc	
4	Projection -introduction, principle, method of projection. Difference between third angle & first angle projection. Draw the projection view in 1^{st} & 3^{rd} method for the same component.		Definition of mass, weight density and their units. Difference between mass & weight Calculate weight of cylinder, cone, sphere etc.	
5	Draw orthographic projections in I & III angle (simple to complex components).		Calculate surface area of chair, table, windows, doors, walls, floors for painting. Calculate cost of painting on the basis of painting material cost & labour cost.	

B. Block- II
Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1	Drawing of different pipe lines and paint as per colour code.	**30**	Solving problems of percentage, ratio and proportions.	**20**
2	Freehand sketching of car body and colour shading practice.		Heat Treatment process of metals and its definitions. Baking process of metal body before and after painting.	
3	Freehand sketching of building (interior & exterior).		Centre of gravity(CG) -definitions, calculation of CG of body. Effect of (CG) centre of gravity in the trade work.	
4	practice of different colour shading		Definition, difference and unit of heat and temperature. Sources of heat and its effect on bodies. Types of heat transfer methods and their differences.	

7.1.2 DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

A. Block –I

Basic Training

Week No.	Professional Skills (275 hrs.)	Professional Knowledge (120 hrs.)
1	• Importance of the Trade training - machinery used In the trade type of work done • Introduction to safety including fire fighting equipments and their uses • surface preparation of wood for varnishing & polishing.	Introduction to elements of arts -such various lines, forms, tones, colour, texture and their applications. Introduction to painting medium such as pencil, canvas, papers, etc.
2	• Sign painting practice in sketching for geometrical shapes, human figures, animal figures and natural scenes with black & white by pencil & colours.	Concept of colour primary secondary & territory. Definition of colour scheme such as tint, shade, hue, tone monochromic, warm colours, glossary of terms for paints & enamels their nature constituents of paints & method of manufacture.
3	• Drawing practice of gothic & roman letters, architectural, ornamental and freehand. Practice on letters & figures of different types, signals, name plates, advertisement etc.	Different types of paints as primer surfaces, under coats, full gloss paint and enamels.
4	• Stenciling: Stencils Cutting practice on cardboard and paper. • Sign board painting in deferent media, chart, poster festoon, banner, models etc. Enamel paint, water colour	• Stenciling: Types of stencils, use & care. Drawing instruments used in lettering, Lettering – types. • Painter hand tools - their description, use, care & maintenance.
5	• Painting of walls system of lay out- Advertisement, Industrial and commercial painting. Layout of painting with combination colouring viz. Cinema posters (Including scenery, lettering and portrait).	• Painting of walls -Layout process, use of paint, Combination of all colour. Method of evaluating the job works, estimating and costing. Preservation of painted articles, posters etc. • General idea of commercial artist activities.
6	• Preparation of wooden surfaces: cleaning, sanding, knotting, artificial wood (staining & graining). • Preparation, mixing of putty-different process of making. Use of putty on different wooden surfaces.	• Theory of preparation of wooden surfaces • Putty - types and uses. Method of mixing & its different system of application.
7	• Surface finishing, varnishing, polishing of wooden furniture such as chair, table, almirahs, trays etc. both old & new. • Preparing of wood surfaces for varnishing, finishing, polishing of doors, windows, panels, partitions of rooms, wooden boxes etc.	• Varnish - its classification, properties, method of varnishing and polishing. Types of varnishes viz. natural & synthetic, Preparation of varnishes. • Safety precaution to use of varnish and paint. Storing process of varnish, paints & its fire prevention.
8	• Metal Surface Painting: Pre-treatment of metal surfaces for scraping, rubbing by emery, wire brushes, etc • Metal pre-treatment such as pickling, phosphating etc.	• Metal Surface Painting: Corrosion: - causes of corrosion, effect of corrosion with effect of atmosphere in different places. Types of emery papers, sanding (wet & dry). • Corrosion on different metals both ferrous and non-ferrous -factors controlling corrosion-corrosion test- atmospheric, water, soil etc. - and its protection.

9	• Preparing of surfaces for primary coat of different metals, practicing by brushes of various sizes- setting and application practice. • Finishing painting by brushes on the metal surfaces like trays, boxes, containers, tables, chairs etc.	• Introduction about primers, its method of application, process for coating different metals and its precaution. • Types of brushes. Painter's equipments ladder, step scaffolding, trestle, buckets etc. their description & use.
10	• Metal pre-treatment such etching, buffing, wire brushing etc. • Painting practice on corroted metal surface.	• Description of metal pre- treatment, its various method and field of application. • Paint - definition, classification, & uses. Method of selection of paints its application, preparation techniques. Purposes and its effect of paints on metal surface.
11	Painting by brushes on wooden furniture surface, such as Chairs, tables, trays, almirahs, racks, boards, panels etc.	Introduction to paint testing equipments. Description of paint making and mixing equipments its use and safety precaution. Causes of application for use of Nitrocellulose / Shellac, Lacquers for wood surface.
12	Painting with brush for different types of pipes such as - cast iron pipe, steel pipe and galvanized pipes, lead pipes, aluminium pipes, synthetic pipes etc.	Introduction to different types of pipe lines such as hot and cold water, liquid & gas, chemicals, oil, steam pipe lines etc. Basic knowledge about colour code symbol for different pipe lines such as gas, steam, water, oil, chemicals etc. Precaution against air pollution. Application of standard paints approved by BIS.
13.	**Revision**	
	Internal Assessment 03days	

B. Block –II
Basic Training

Week No.	Professional Skills	Professional Knowledge
1.	SPRAY PAINTING: Spray painting practice on metal surfaces with spray gun (Conventional and Electrostatic)	SPRAY PAINTING: Introduction of spray painting, it's spraying techniques and safety precautions. Advantage and disadvantages of spray painting technique. Introduction to air compressor use for painting work, its types, functions, working and safety precaution etc. Spray painting guns its types, functions, working and safety precautions. Description of various spray painting plants/booth & equipments, method of construction their fields of applications, health & safety precaution etc. on spray painting.
2	Practice on painting by dipping the metal surfaces, like trays, boxes, containers, castings frames, garden benches etc	WALL SURFACE PAINTING: Description of bonds for plastering walls. Techniques of constructing walls. Methods of erecting scaffolding. Purpose of cleaning walls surfaces. Processes of cleaning, different methods of cleaning, its description, precautions and uses.
3	PAINTING: Preparing of surfaces walls, cleaning of rough surfaces, use of nail brushes, iron hit, chiseling, rubbing by emery & brushes etc. for distempering. Introduction to dipping by hand & mechanical application,	Types of wall primer and putty. Lime colour, dry distemper, cement paint, for wall. Process for applying of distemper & cement paints, and its precaution.
4	Primaring of wall surface and putty filling. Paints & colour shade making, matching colours for ceiling and walls, relief painting and texturing of walls and ceiling. Method of making scaffolding.	The methods employed in preparing surfaces for oil painting of wall, various painting defects and their remedies. Method of wall painting with oil colour paint. Emulsion paints for buildings.
5	Preparing of wall surface for oil paint.	Method of preparing various oil paints shades. Remedies of atmospheric corrosion (exterior wall). Calculation of paints required quantity for job work.
6	Painting of walls & ceiling with oil paints.	Painter's wall painting equipments its classification, functions & their uses. Principles of roller and brush painting its application and precautions. Analysis of rates for simple items of painting works.
7	Painting of residential house/offices walls with interior emulsion paints. Colouring of door & windows with oil paints.	Buildings painting by spray gun and brushes, difference -specific application & their defects & remedies. Different colour used, selection of paints for different types of fitting, electrical, water supply, sanitary & drainage line special consideration on painting of high rise building.
8	Painting of exterior walls with emulsion and cement paints.	Pigment, definition, types of pigments, properties of pigments manufacturing processes, their different types and uses.
9	Preparation of pigment driers, resins, etc. Practice in the mixing and matching of colours, coloured objects	Application of oil driers, resins etc. & their purpose, colour pigments, matching of colours in both oil and

	and materials in both oil & water medium.	water medium.
10	Testing of different varnishes for special gravity weight per litre, viscosity, hardness gloss and finish, adhesion, flexibility & drying time.	Method of testing varnishes. Method of testing paints.
11	Testing of different paints for special gravity weight per litre, viscosity, hardness gloss and finish, adhesion, flexibility & drying time.	• Enamel is air drying & stoving. Testing of oil strainers, dry pigments, volatile paints thinners, viscosity drying gloss finish, weight per litre, flexibility & adhesion • The procedures involved in novelty painting, precaution to be taken colour schemes.
12	• Stoving enamel of sheet metal & cast iron articles such as cycle parts , fan etc. • Novelty finishes air drying of different articles such as fans, type writers, ovens	• Difference between AED (Anode Electron deposition) and CED (Cathode Electron deposition) Method. • Robotic spray painting knowledge.
13.	**Revision**	
	Internal Assessment 03 days	

7.1.3 EMPLOYABILITY SKILLS

GENERAL INFORMATION

1)	**Name of the subject**	**:**	**EMPLOYABILITY SKILLS**
2)	**Applicability**	**:**	ATS- Mandatory for fresher only
3)	**Hours of Instruction**	**:**	**110 Hrs. (55 hrs. in each block)**
4)	**Examination**	**:**	The examination will be held at the end of two years Training by NCVT.
5)	**Instructor Qualification**	**:**	

i) MBA/BBA with two years experience or graduate in sociology/social welfare/Economics with two years experience and trained in Employability skill from DGET Institute.

And

Must have studied in English/Communication Skill and Basic Computer at 12th /diploma level

OR

ii) Existing Social Study Instructor duly trained in Employability Skill from DGET Institute.

7.1.3.1 SYLLABUS OF EMPLOYABILITY SKILLS

A. Block – I
Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	**15**
1	**Pronunciation :** Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)	
2	**Functional Grammar** Transformation of sentences, Voice change, Change of tense, Spellings.	
3	**Reading** Reading and understanding simple sentences about self, work and environment	
4	**Writing** Construction of simple sentences Writing simple English	
5	**Speaking / Spoken English** Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.	
	I.T. Literacy	**15**
1	**Basics of Computer** Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
2	**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.	
3	**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	
4	**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, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites	

	and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.	
	Communication Skill	**25**
1	**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. Case study/Exercise	
2	**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.	
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. Case study/Exercise	
4	**Facing Interviews** Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview	
5	**Behavioral Skills** Organizational Behavior Problem Solving Confidence Building Attitude Decision making Case study/Exercise	

B. Block– II
Basic Training

Topic No.	Topic	Duration (in hours)
	Entrepreneurship skill	**10**
1	**Concept of Entrepreneurship** **Entrepreneurship**- 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.	
2	**Project Preparation & Marketing analysis** Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of Product Life Cycle (PLC), Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.	
3	**Institutions Support** Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.	
4	**Investment Procurement** Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.	
	Productivity	**10**
1	**Productivity** Definition, Necessity, Meaning of GDP.	
2	**Affecting Factors** Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3	**Comparison with developed countries** Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.	
4	**Personal Finance Management** Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	**10**
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	
5	**Basic Provisions** Idea of basic provision of safety, health, welfare under legislation of India.	
6	**Ecosystem** Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.	
7	**Pollution** Pollution and pollutants including liquid, gaseous, solid and hazardous waste.	
8	**Energy Conservation** Conservation of Energy, re-use and recycle.	
9	**Global warming** Global warming, climate change and Ozone layer depletion.	
10	**Ground Water** Hydrological cycle, ground and surface water, Conservation and Harvesting of water	
11	**Environment** Right attitude towards environment, Maintenance of in -house environment	
	Labour Welfare Legislation	**5**
1	**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.	
	Quality Tools	**5**
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	**Quality Management System :** Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.	
4	**House Keeping :** Purpose of Housekeeping, Practice of good Housekeeping.	
5	**Quality Tools** Basic quality tools with a few examples	
	Leadership and Team Building skills.	**5**
	Leadership Discipline and Morale Team Work Case Study/ Exercise	
	Meet the Mentor **Role - play as a Supervisor**	**5**

	Organizing and Planning.	**5**
	Time Management Group Dynamics Case Study/ Exercise	

7.2 PRACTICAL TRAINING (ON-JOB TRAINING)
(BLOCK – I & II)
DURATION: 18 MONTHS (9 months in each block)

GENERAL INFORMATION

1) **Name of the Trade** : **PAINTER (GENERAL)**

2) **Duration of On-Job Training** : a) Block–I: 9 months
b) Block–II : 9 months

Total duration of Practical Training: 18 months

3) **Batch size** : a)Selection of Apprentices as per apprenticeship guidelines.
b) Max. 16 trainees per group

4) **Examination** : i) The internal assessment will be held on completion of each block
ii) NCVT exam will be conducted at the end of 2nd year.

5) **Instructor Qualification** :

i) Degree/Diploma in **PRODUCTION / CHEMICAL Engg.** from recognized university/Board With one/two year post qualification experience in the relevant field.

OR

ii)NTC/NAC in the trade of **PAINTER (GENERAL)**with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

6) **Tools, Equipments & Machinery required** : - As per Annexure – II

7.2.1 BROAD SKILL COMPONENT TO BE COVERED DURING ON-JOB TRAINING

A. BLOCK – I

1. Instruction in safety precautions on the shop-floor. Introduction to Fire Safety. Do's and Don'ts of Paint shop and emergency preparedness.
2. Practice in free hand sketching of human figures, animal figures, geometrical figures, hand scopes etc.
3. Practice in using of graphs for accurate drawing & enlarging of small units.
4. Practice in painting of letters for name plates, road signs, signals and various types of advertisements.
5. Practice in preparing of sign-board paintings, posters, banners, festoons of different sizes and natures.
6. Preparation of Industrial & commercial paintings and preparation of big hording on different surfaces like ply board, tin, masonite board etc.
7. Preparation of cinema posters in multi-color including lettering and drawing portraits on it.
8. Preparation and use of single or multiple plate stencils positive and negative according to need.
9. **Pretreatment of Metal surface :** 7 steps of metal surface treatment : De-Scaling, De-rusting, Degreasing, Activation, Phosphating, Passivation and rinse
10. Practice in preparing of metal surface by rubbing with emery, scraping, wire brushing and manual chipping.
11. Preparing of metal surfaces with mechanical pneumatic chippers.
12. Preparing of surfaces of steel body by portable grinder.
13. Descaling of metal surfaces by vacuum blast machine.
14. Flame cleaning of rusted surfaces.
15. Pre-treatment of ferrous and non-ferrous surfaces by degreasing, etching, picking and solvent wiping.
16. Cleaning and wiping of the different surfaces to be painted to the required standard.

B. BLOCK – II

1. Preparing of adhesive compound like putties, fillers and metal cements applying them on metal and wooden surfaces.
2. **Paint mixing system** in industrial application.
3. Selecting, mixing & preparing of all types of oil paints & water paints.
4. Selecting, mixing and preparing of all types of synthetic paints and such other paints to obtain specific colors.
5. Sand or grit blasting of metal surfaces for painting by sand blasting machines.
6. **Colour coding of pipe line** as per ISO standard
7. **Industrial Paint Booth** system: Knowledge about its functioning. Must know Do`s & Don`ts of paint booth. Fire Safety for paint booth and emergency preparedness. Parameter setting like Temperature,

Humidity, dust particles, Lux level etc. for ensuring good parts quality. Coagulation tank function and importance

8. **Auto body Sealant system**: - Auto body sealant application methods and technique. Identification of Sealant defects, cause & its remedy. UBS (Under body sealant) type, application , defects, cause and rectification. Knowledge of Sealant pump and gun.
9. Pre-treatment, applying of primers coats and spray painting of surfaces on car body and finishing by different process.
10. Pre-treatment and spray painting of surfaces on scooters and motor cycles.
11. Pre-treatment, applying of primer coats and spray painting of surfaces on refrigerators/domestic appliances.
12. Pre-treatment, applying of primers and spray painting on the surfaces of steel furniture like Almirah, Chairs, Tables, Trays, Racks etc.
13. Practice in stove enameling of different articles such as cycle, fan, typewriter parts etc. for novelty finish including air drying.
14. Melt sheet application and its rectification.
15. Curing method purpose & type like Electrical, LPG, LDO. Propane. (Elaborated)
16. Practice in silk screen painting, use of mask and templates.
17. Practice in staging work, scaffolding and painting at height.
18. Handling of different types of spray painting machines in different types of painting booth including spray guns.
19. Rectifying the common coating failure and repairing of various painting defects.
20. Testing of different paints and varnishes regarding fluidity, spreading, density, viscosity, adhesiveness, drying, harding etc.
21. Interpretation of the layout or design and subsequent adoption of them for painting.
22. Practice in cleaning and maintaining of all tools and equipment required for painting.
23. Practice in safe way of storage of paints and varnishes.
24. Maintenance of painting schedules and following ISI specifications and other painting regulations.
25. Buffing and polishing.
26. Difference between AED (Anode Electron deposition) and CED (Cathode Electron deposition) Method.
27. Robotic spray painting knowledge.

8. ASSESSMENT STANDARD

8.1 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 to be given while assessing for team work, avoidance/reduction of scrape/wastage and disposal of scarp/wastage as per procedure, behavioral attitude and regularity in training.

The following marking pattern to be adopted while assessing:

a) Weightage in the range of 60-75% to be allotted during assessment under following performance level:

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

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- many tolerances while undertaking different work are in line 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 above75%- 90% to be allotted during assessment under following performance level:

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.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- the majority of tolerances while undertaking different work are in line with those 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 above 90% to be allotted during assessment under following performance level:

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.

In this work there is evidence of:

- high skill levels in the use of hand tools, machine tools and workshop equipment
- tolerances while undertaking different work being substantially in line 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

8.2 FINAL ASSESSMENT- ALL INDIA TRADE TEST (SUMMATIVE ASSESSMENT FOR TWO YEARS TRADE)

SUBJECTS	Marks	Sessional Marks	Full Marks	Pass Marks	Duration of Exam.
Practical	300	100	400	240	**08 hrs.**
Trade Theory	100	20	120	48	3 hrs.
Workshop Cal. & Sc.	50	10	60	24	3 hrs.
Engineering Drawing	50	20	70	28	4 hrs.
Employability Skill	50		50	17	2 hrs.
Grand Total	**550**	**150**	**700**	**-**	

Note: - The candidate pass in each subject conducted under all India trade test.

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9. FURTHER LEARNING PATHWAYS

- On successful completion of the course trainees can opt for Diploma course (Lateral entry). [Applicable for candidates only who undergone ATS after CTS]

- On successful completion of the course trainees can opt for CITS course.

Employment opportunities:

On successful completion of this course, the candidates may be gainfully employed in the following industries:

1. Production & Manufacturing industries.
2. Building & construction, Structural and Fabrication industries.
3. Automobile and allied industries
4. Service industries.
5. Ship building and repair
6. Infrastructure organisations
7. In public sector industries(Central and State) and private industries in India & abroad.
8. Self employment

ANNEXURE – I

10. TOOLS & EQUIPMENT FOR BASIC TRAINING

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

TRADE: PAINTER (GENERAL)

LIST OF TOOLS & EQUIPMENTS FOR 16 APPRENTICES

A : TRAINEES TOOL KIT:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Try Square 150 mm	17Nos.
2.	Scriber	17Nos.
3.	Sliding T - Bevel	17Nos.
4.	Marking Gauge	17Nos.
5.	Wing Compass	17Nos.
6.	Hand Saw 450 mm	17Nos.
7.	Ball peen hammer 250 gm	17Nos.
8.	Aerograph (Air Brush)	17Nos.
9.	Pallets (consumable)	17Nos.
10.	Beam Compass (Stencil cutting)	17Nos.
11.	Stencil Knife (consumable)	17Nos.
12.	Trestle Painter with stools	17Nos.
13.	Goggles (consumable)	17Nos.
14.	Gloves (consumable)	17Nos.
15.	Spraying Mask (consumable)	17Nos.
16.	Lay Brush (consumable)	17Nos.
17.	Face Mask & Respirator (consumable)	17Nos..

B : TOOLS INSTRUMENTS AND GENERAL SHOP OUTFITS

Sl. No.	Name of the items	Quantity (indicative)
18.	Blow Lamp 500 ml	5 Nos..
19.	Steps ladder (wooden)	3 Nos.
20.	Combs (Steel)	10 Nos.
21.	Flatter Roller (consumable)	10 Nos.
22.	Portable Electrical hand grinder	2 Nos.
23.	Disc grinder set	2 No.
24.	Digital balance (1- 2) Kg capacity	2 No.
25.	Weight per liter cup	4 Nos.
26.	Ford cup No. 4 for viscosity measurement	4 Nos.
27.	Stop Watch	2 Nos.
28.	Electric oven for paint baking	1 Nos.
29.	DFT gauge machine (digital)	2 No.
30.	Gloss meter (digital)	2 No.
31.	Scratch hardness tester	2 No.
32.	Resistively - Meter	2 No.
33.	Hegman gauge	2 No.
34.	Bench working 240 x 120 x 90 cm.	4 nos.
35.	First- aid box	As required

C : GENERAL MACHINERY INSTALLATIONS:-

Sl. No.	Name & Description of Machines	Quantity (indicative)
1.	Gun spray with gravity cup complete with accessories and portable Electric air compressor (with single phase motor).	4 sets.

Note: In case of basic training setup by the industry the tools, equipment and machinery available in the industry may also be used for imparting basic training.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: PAINTER (GENERAL)

LIST OF TOOLS & EQUIPMENTS FOR 16 APPRENTICES

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

2) Infrastructure:

A : TRAINEES TOOL KIT:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Draughtsman drawing instrument box	16+1 set
2.	Set square celluloid 45^0 (250 X 1.5 mm)	16+1 set
3.	Set square celluloid 30^0-60^0 (250 X 1.5 mm)	16+1 set
4.	Mini drafter	16+1 set
5.	Drawing board (700mm x500 mm) IS: 1444	16+1 set

B : FURNITURE REQUIRED

Sl. No.	Name of the items	Quantity (indicative)
1.	Models : Solid & cut section	as required
2.	Drawing Table for trainees	as required
3.	Stool for trainees	as required
4.	Cupboard (big)	01
5.	White Board (size: 8ft. x 4ft.)	01
6.	Trainer's Table	01
7.	Trainer's Chair	01

ANNEXURE – II

11. INFRASTRUCTURE FOR ON-JOB TRAINING

TRADE: PAINTER (GENERAL)

For Batch of 16 APPRENTICES

Actual training will depend on the existing facilities available in the establishment. However, the industry should ensure that the broad skills defined against On-Job– Training part (i.e. 9 months + 9 months) are imparted. In case of any short fall the concerned industry may impart the training in cluster mode / in any other industry / at ITI.

ANNEXURE-III

12. GUIDELINES FOR INSTRUCTORS AND PAPER SETTERS

1. Due care to be taken for proper & inclusive delivery among the batch. Some of the following some method of delivery may be adopted:

A) LECTURE
B) LESSON
C) DEMONSTRATION
D) PRACTICE
E) GROUP DISCUSSION
F) DISCUSSION WITH PEER GROUP
G) PROJECT WORK
H) INDUSTRIAL VISIT

2. Maximum utilization of latest form of training viz., audio visual aids, integration of IT, etc. may be adopted.

3. The total hours to be devoted against each topic may be decided with due diligence to safety & with prioritizing transfer of required skills.