

**CURRICULUM**

**FOR THE TRADE OF**

**MOTOR VEHICLE BODY BUILDER**

**UNDER**

**APPRENTICESHIP TRAINING SCHEME**



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

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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 22<sup>nd</sup> 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 **Motor Vehicle Body Builder** trade)

1. Better learning opportunities at industry in Motor Vehicle Body Builder with latest advanced technology that will enhance the employability opportunities
2. It helps to improve the practical skills acquired and the ability to perform highly specialized jobs related to latest design of Vehicle Body.
3. It provides exposure to advanced manipulator systems in custom-building body panels from sheet metal before welding them into place.
4. It will enhance the ability to work to interior design with help of special tools and machineries.
5. It will help to develop the ability to understand customer expectations and priming and paint spraying the body, using the manufacturer instructions on colour matches.
6. The training on best industrial practices in fitting new parts/panels efficiently.
7. It will enhance the advanced skill ability to repair damaged panels or parts with high level of accuracy.

## 4. JOB ROLES: REFERENCE NCO

### **Brief description of Job roles:**

**Body Builder**, Automobile constructs rigid body on auto-chassis with or without super-structure using wood and metal frames for passenger buses, goods trucks, lorries, vans, etc. Studies sketches or blue print regarding type of body to be built. Selects required sizes of timber pieces and collects finished metal parts. Cuts and shapes wood for body using hand or power tools. Builds frame work, lining, floors, ceiling and other wooden parts according to drawing and other specifications. Fits longitudinal runners, cross barriers, vertical posts etc. and tightens frame rigidly to chassis. Fits assembled or welded metal frame over wooden longitudinal runners and cross members and assembles metal panel, roof covers, doors, etc., to wooden frame using nuts and bolts, etc., to wooden attachments such as fasteners, handles, hooks, lockers, etc., to frame or body as required. May fix interior fittings and repair or replace parts. May specialize in building any particular type of coach such as ambulance vans, passenger buses, army vehicles, goods lorries etc.

**Body Builder**, Other Vehicles assembles and repairs wooden parts of vehicle body on metal frame with specified seating and other arrangements and screws masonite, wooden planks, hard boards, plywood etc., according to specifications for constructing bodies of vehicles not elsewhere classified such as cycle rickshaw, auto rickshaw etc. (excluded are CART BUILDERS AND WHEEL WRIGHTS). Takes exact measurements of metal body for cutting required sizes of wooden parts. Cuts wooden plank, masonite or hard board to required sizes using hand saw and drills holes with hand drill. Fits cut pieces of plank, or board over metal frame and secures them tightly with bolts and nuts, or screws as required. May fit cushions, seats, arms rests and hoods to rickshaws.

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

Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

### **Reference NCO:**

- i). **NCO-2004:** 7422.25, 7422.30

## 5. GENERAL INFORMATION

1. **Name of the Trade** : **MOTOR VEHICLE BODY BUILDER**

2. **N.C.O. Code No.** : **NCO-2004: 7422.25, 7422.30**

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

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 in 10th class examination under 10+2 system of education or its equivalent.

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

6. **Rebate for ITI passed trainees** : i) **One year** in the trade of **Sheet Metal Worker/ Welder (Gas & Electric)**.

*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: -

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

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
<b>Basic Training Block - I</b>	█	█	█																					
<b>Practical Training Block - I</b>				█	█	█	█	█	█	█	█													
<b>Basic Training Block - II</b>													█	█	█									
<b>Practical Training Block - II</b>																█	█	█	█	█	█	█	█	█

**7. SYLLABUS**  
**7.1 BASIC TRAINING**  
**(BLOCK – I & II)**  
**DURATION: 06 MONTHS**

**GENERAL INFORMATION**

- 1) **Name of the Trade** : **MOTOR VEHICLE BODY BUILDER**
- 2) **Hours of Instruction** : 1000 Hrs. (500 hrs. in each block)
- 3) **Batch size** : 20
- 4) **Power Norms** : 11 KW for Workshop
- 5) **Space Norms** : 80 Sq. m.
- 6) **Examination** : The internal assessment will be held on completion of each Block.
- 7) **Instructor Qualification** :

i) Degree/Diploma in **Mechanical** 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 Motor **Vehicle Body Builder/ Welder/ Sheet Metal Worker** 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.	Engineering Drawing: Introduction and its importance Different types of standards used in engineering drawing. Drawing Instruments: their uses Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.	<b>30</b>	<b>Units &amp; Measurements-</b> FPS, CGS, MKS/SI unit, unit of length, Mass and time. Fundamentals and derived units Conversion of units and applied problems.	<b>20</b>
2.	Lines : types and applications in Drawing as per BIS SP:46-2003 Drawing geometrical object using all types of lines. <b>Drawing of Geometrical Figures:</b> Angle, Triangle, Square, Rectangle and Circle. <b>Letters:</b> - Lettering styles, Single stroke letters and numbers as per IS standard. Lettering practice		<b>Material Science :</b> properties - Physical & Mechanical, Types - Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals	
3.	<b>Dimensioning-</b> Types of dimension, elements of dimensions, Methods of indicating Values, Arrangement, Alignment and indication of dimensions. <b>Scales:-</b> Types use and construction. Representative factor of scale.		<b>Mass .Weight and Density :</b> Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density,	
4.	Method of presentation of Engineering Drawing - Pictorial View - Orthogonal View - Isometric view		<b>Speed and Velocity:</b> Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation. Average Velocity, Acceleration & Retardation. Related problems. Circular Motion: Relation between circular motion and Linear motion, Centrifugal	

			force, Centripetal force	
5.	<b>Constructions:</b> - Draw proportionate free hand sketches of plane figures. Sketch horizontal, vertical and inclined line by free hand, Draw circles by free hand using square and radial line method, Draw arcs and ellipse by free hand		<b>Ratio &amp; Proportion :</b> Simple calculation on related problems. <b>Percentage:</b> Introduction, Simple calculation.	
6.	Projections: Concept of axes plane and quadrant. Orthographic projections Method of first angle and third angle projections (definition and difference) Symbol of 1 <sup>st</sup> angle and 3 <sup>rd</sup> angle projection as per IS specification. Free hand Drawing of Orthographic projection from isometric/3D view of geometrical blocks		<b>Work, Power and Energy:</b> work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy. Meaning of H.P., I.H.P., B.H.P., and F.H.P. and CC and Torque.	

## B. Block- II Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1.	<b>Screw :-</b> Its Types and Sizes, Screw thread, their standard forms as per BIS, external and internal thread.	<b>30</b>	<b>Algebra:</b> Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	<b>20</b>
2.	<b>Rivets and Joints:-</b> Prepare a drawing sheet on rivets nomenclature and Joints.		<b>Heat &amp; Temperature:</b> 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.	
3.	Free hand Sketches for simple pipe line with general fittings.		<b>Mensuration:</b> 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. Volume of cut-out solids: hollow cylinders, frustum of cone, block section. Volume of simple solid blocks.	
4.	Reading of drawing. Simple exercises related to missing lines, dimensions. How to make queries.		<b>Basic Electricity:</b> Introduction, use of electricity, how electricity is produced, Types of current_ AC, DC, their comparison, voltage, resistance, their units. Conductor, insulator, Types of connections - series, parallel, electric power, Horse power, energy, unit of electrical energy. Concept of earthing.	
5.	Simple exercises related to trade related symbols. Basic electrical and electronic symbols		<b>Simple machines</b> <b>Transmission of power:</b> - Transmission of power by belt, pulleys & gear drive. <b>Heat treatment process:</b> - Heat treatment and advantages. Annealing, Normalizing,	

			Hardening, Tempering.	
6.	Free hand sketch of trade related components / parts /cutting tool indicating angles.		<p><b>Trigonometry:</b>  Trigonometrical ratios, measurement of angles.  Trigonometric tables.  Finding the value of unknown sides and angles of a triangle by Trigonometrical method.  Finding height and distance by trigonometry.  Application of trigonometry in shop problems. (viz. taper angle calculation).  Calculate the area of triangle by using trigonometry and application of Pythagoras theorem.</p>	
7.			<p><b>Concept of pressure -</b>  <b>Definition:-</b>Force, Pressure, and their units, atmospheric pressure, gauges used for measuring pressure, problems.</p> <p>Introduction to pneumatics &amp; hydraulics systems.</p>	
8.	<b>Simple exercises related to trade related Test Papers. Solution of NCVT test papers.</b>			

## 7.1.2 DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

### A. Block –I

#### Basic Training

Week No.	Professional Skills	Professional Knowledge
1.	<p>Induction to safety devices used in shop floor.            Identification of Tools and Equipments            Induction and use of marking tools.            Practice in Reading, Steel Rule, Scribing of straight lines, Bisecting of straight lines (on the sheet metal) using marking tools.</p>	<p>General safety precautions            Safety precaution in sheet metal work            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.            Introduction to 5S concept &amp; its application.            Fire: - Types, causes and prevention methods.            Fire Extinguisher, its types.            Metals and Non-Metals and their Characteristics,            Types, Sizes and uses of Sheet Metals as per BIS.            Use of reference table.            Raw material information: CRCA, HRCA &amp; MS Material            Terms &amp; definitions in sheet metal work.</p>
2	<p>Mark and cut through the straight lines            Planishing of Sheet Metal and Practice in drawing simple Geometrical shapes.            Practice in marking and cutting of sheets to various angles.</p>	<p>Mark and cut through the straight lines            Planishing of Sheet Metal and Practice in drawing simple Geometrical shapes.            Practice in marking and cutting of sheets to various angles.</p>
3	<p>Practice on cutting with different types of snips.            Tin snips (Straight cut, Right cut and Left cut) cutting off inside and outside curve, cutting off notches and cutting off profiles.</p>	<p>Hand tools : mallets, hammer, sheet metal hammers, groovers, riveting tools, screw drivers, wrench and spanners etc.            Holding tools &amp; accessories: vices, C clamps, stakes, stakes holder, hollow mandrel, wooden former.</p>
4	<p>Riveting practice using various types of rivet heads.            Single chain riveted joint. Double chain and Zig- zag, Lap &amp; butt riveted joints</p>	<p>Rivets and its parts, Selection of Rivet heads.            Types of Rivet and their uses.            Standard sizes of Rivets and Riveting Tools.            Calculation for Riveting allowances (pitch and Lap</p>
5	<p>Simple fitting operations such as Chipping, Hacksawing, Filing, Drilling, Thread forming (Tap and Die).</p>	<p>Hand tools and its importance, steel rule, Try square, chisel and care &amp; maintenance,            Classification and types of chisels, files and uses. Hacksaw blade, Hacksaw frame and its types. Drill bits- parts, Types &amp; uses.</p>
6	<p>Hand forging operations such as Cold and Hot bending. Spreading, Upsetting, Drawing,</p>	<p>Simple Forging operations such as Jumping, Bending, Upsetting, Drawing, Shouldering,</p>



	Shouldering, Punching, Drifting, Forge welding and Shrinking.	Punching. Drifting and Shrinking
7	Simple heat treatment operations such as Hardening, Tempering, Normalising, Annealing, Casehardening.	Heat treatment of metals. Different processes and their advantages. Hardening, Tempering, Normalising, Annealing and Case hardening
8	Soldering, Tinning and Brazing and simple sheet metal operations such as Bending, Rolling, Shaping, Flanging, Edging, Hollowing, reinforcement of sheet metal components.	Soldering and brazing of metals. Types of solder and fluxes. Purposes and use of fluxes.
9	Riveting and Riveted joints (Hot and Cold) Practice on riveting by using Pop rivets. Aluminium (solid) Copper Rivet M.S. Rivet. Tubler Rivet and Bifurcated Rivet and its use. Types of Rivet Guns : (1) For Solid Rivet. (2) For Pop Rivet.	Description and uses of non-ferrous metals. Copper, Aluminium, Brass, Zinc, Lead, Tin, Muntzmetal broad principles of manufacturing the above metals.
10	Handling of different types of grinding machines such as bench grinder pedestal grinder, hand and Flexible grinder.	Description about different types of Grinding Machines-Bench Grinder, pedestal, hand and Flexible Grinder.
11	Simple welding (Gas & Electric) including brazing. Use of 'Spot Welding equipment in Sheet Metal'. Practice on Gas cutting.	Brief description of welding equipment (Gas & Electric) and the processes of welding.
12	Marking out as per drawing and cutting off sheet metal by using hand liver shears and Nibbling shears	Different types of sheets used in Body Building protective coats of sheet metal Galvanising. Anodizing, Tinning, Painting etc.
13	<b>Internal Assessment 03 days</b>	

**B. Block –II**  
**Basic Training**

Week No.	Professional Skills	Professional Knowledge
1.	Use of Common hand tools used in the shop floor such as hammer, chisel, hacksaw, steel rule, dividers, calipers, punches, shears, blow lamp, centre punch, scribe, D.E. spanner, Ring spanner, Torque Wrench for 'IT clamping, screw driver.	Description and use of special tools, used in the Motor Vehicle Body Building Work, such as Panel Pliers, Duck bill snips, Metal shears, Offset screw drivers, Door handle tools, Dolly block of different types, Body panel spoon, Body file holder, Bumping hammer, Roughing hammer, Pneumatic drilling and Riveting attachments.
2.	Cutting and shearing runner angles, flats and channels to required dimensions. Straightening runner angles, flats and channels both by hand and by machine.	Methods of forming simple parts by hand work and by mechanical press tools and equipment and fittings used in this process.
3.	Making simple components and sub-assembly related to Motor vehicle body.	Methods of mounting body on the chassis.  <b>Problem Solving Tools:</b> Basic 7 Quality Tools.
4-5.	Bending practice on angles, tube and flat of different sizes and assembling by different welding technique as per drawing to make utility structure like footsteps, battery box, ladder, diesel tank brackets, etc.	Techniques impressing steel body panels door, windows, quarter panel mounting.
6.	Spot welding, seam welding.  Deposit bead on MS sheet in flat position. Lap joint T joint and butt joint in down hand position. TIG welding. Deposit bead on SS sheet in flat position. Making butt, Tee and corner joint.	Various methods of finishing and fixing metal panels to body frame work. Special steels used for pressing in body work. Adhesives used in Motor Vehicle Body Building sealing compound for body joints and trim assembly.
7.	Gas cutting of sheets. Grinding of tool including drill bits. Identify different power operated machines such as pneumatic drilling, riveting and tightening, power hammer and their operation.	Use of leather cloth carpet, linoleum and glass panels, qualities and grades in common use.
8.	Pipe bending and flaring of pipe. Joining of pipes & test for leakage. Make by soldering Elbow 90° equal dia pipe T joint 90° equal dia pipe	Provision of clamps and piping for concealed wiring for wiring hardness for interior lamps, lamp switches, lighter/heater fans, radio, tape recorder, speaker, television, air conditioner

	T joint 90° unequal dia pipe by soldering Make by soldering T Pipe 60° branch joint unequal dia pipe Offset T joint equal dia	and power operated units.
9-10.	Practice on making driver door, emergency door and other doors with hinges. Making holes in sheet metal using Punching Machine.  Making holes in sheets with a twist drill.  Practice in Drilling Holes in walls and Ceilings as applied to ducting work.	Brief description arrangements and types of seat frames and back rests, handles, partitions, grill assembly rails, inner grab.
11.	Practice cutting, pressing, bending and forming to make different utility items.	Repairing of damaged fenders, doors, and frames checking frame, alignment.
12.	Identify different painting defects and remedies to set right the defects. Practice of Buffing and polishing	Estimation of materials used for construction of Motor Vehicle body, cost of construction and weight on the body.
13.	<b>Revision &amp; Internal Assessment</b>	

### **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 12<sup>th</sup> /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)
	<b>English Literacy</b>	<b>15</b>
<b>1</b>	<b>Pronunciation :</b> Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)	
<b>2</b>	<b>Functional Grammar</b> Transformation of sentences, Voice change, Change of tense, Spellings.	
<b>3</b>	<b>Reading</b> Reading and understanding simple sentences about self, work and environment	
<b>4</b>	<b>Writing</b> Construction of simple sentences Writing simple English	
<b>5</b>	<b>Speaking / Spoken English</b> 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.	
	<b>I.T. Literacy</b>	<b>15</b>
<b>1</b>	<b>Basics of Computer</b> Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
<b>2</b>	<b>Computer Operating System</b> 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.	
<b>3</b>	<b>Word processing and Worksheet</b> 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	
<b>4.</b>	<b>Computer Networking and INTERNET</b> 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),	

	<p>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.</p> <p>Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.</p>	
	<b>Communication Skill</b>	<b>25</b>
<b>1</b>	<p><b>Introduction to Communication Skills</b>  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</p>	
<b>2</b>	<p><b>Listening Skills</b>  Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.  Triple- A Listening - Attitude, Attention &amp; Adjustment.  Active Listening Skills.</p>	
<b>3</b>	<p><b>Motivational Training</b>  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</p>	
<b>4</b>	<p><b>Facing Interviews</b>  Manners, Etiquettes, Dress code for an interview  Do's &amp; Don'ts for an interview</p>	
<b>5</b>	<p><b>Behavioral Skills</b>  <b>Organizational Behavior</b>  Problem Solving  Confidence Building  Attitude  Decision making  Case study/Exercise</p>	

**B. Block– II**  
**Basic Training**

<b>Topic No.</b>	<b>Topic</b>	<b>Duration (in hours)</b>
	<b>Entrepreneurship skill</b>	<b>15</b>
1	<b>Concept of Entrepreneurship</b> <b>Entrepreneurship-</b> 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	<b>Project Preparation &amp; Marketing analysis</b> 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	<b>Institutions Support</b> 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	<b>Investment Procurement</b> Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.	
	<b>Productivity</b>	<b>10</b>
1	<b>Productivity</b> Definition, Necessity, Meaning of GDP.	
2	<b>Affecting Factors</b> Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3	<b>Comparison with developed countries</b> 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	<b>Personal Finance Management</b> Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	<b>Occupational Safety, Health &amp; Environment Education</b>	<b>15</b>
1	<b>Safety &amp; Health</b> Introduction to Occupational Safety and Health importance of safety and health at workplace.	

2	<b>Occupational Hazards</b> Basic Hazards, Chemical Hazards, Vibro-acoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.	
3	<b>Accident &amp; safety</b> Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.	
4	<b>First Aid</b> Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person	
5	<b>Basic Provisions</b> Idea of basic provision of safety, health, welfare under legislation of India.	
6	<b>Ecosystem</b> Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.	
7	<b>Pollution</b> Pollution and pollutants including liquid, gaseous, solid and hazardous waste.	
8	<b>Energy Conservation</b> Conservation of Energy, re-use and recycle.	
9	<b>Global warming</b> Global warming, climate change and Ozone layer depletion.	
10	<b>Ground Water</b> Hydrological cycle, ground and surface water, Conservation and Harvesting of water	
11	<b>Environment</b> Right attitude towards environment, Maintenance of in -house environment	
	<b>Labour Welfare Legislation</b>	<b>5</b>
1	<b>Welfare Acts</b> 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.	
	<b>Quality Tools</b>	<b>10</b>
1	<b>Quality Consciousness :</b> Meaning of quality, Quality Characteristic	
2	<b>Quality Circles :</b> 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	<b>Quality Management System :</b> Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.	
4	<b>House Keeping :</b> Purpose of Housekeeping, Practice of good Housekeeping.	
5	<b>Quality Tools</b> Basic quality tools with a few examples	



**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** : **MOTOR VEHICLE BODY BUILDER**
- 2) **Batch size** : a) Apprentice selection as per Apprenticeship guidelines.  
b) Maximum 20 candidates in a group.
- 3) **Examination** : i) The internal assessment will be held on completion of each block  
ii) NCVT exam will be conducted at the end of 2<sup>nd</sup> year.
- 4) **Instructor Qualification** :

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

**OR**

ii) NTC/NAC in the trade of Motor **Vehicle Body Builder/ Welder/ Sheet Metal Worker** with three year post qualification experience in the relevant field.

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

- 5) **Infrastructure for On-Job Training** : - As per Annexure – II

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

### A. 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. Use of Common hand tools used in the shop floor such as hammer, chisel, hacksaw, steel rule, dividers, calipers, punches, shears, blow lamp, protractor, vernier, centre punch, scriber, D.E. spanner, Ring spanner, Torque Wrench for 'IT clamping, screw driver. Bench vice. Grinding Machine and Box spanner-special types of fabrication spanners to suit the assembly conditions.
4. Marking on Sheet Metal, Shearing, Bending, Notching, Punching for pillars, Waist rail etc. Explain the body structure parts and materials.
5. Handling of different types of grinding machines such as modified Angular. Automatic and Flexible.
6. Lighting and maintenance of forge by manual and power.
7. Simple forging operations such as Hammering Square, round, Flat, Hexagon, Octagon, Tapered sections and Jumping.
8. Hand forging operations such as Cold and Hot bending. Spreading, Upsetting, Drawing, Shouldering, Punching, Drifting, Forge welding and Shrinking.
9. Grinding of forged articles and hand tools including drill bits.
10. Simple heat treatment operations such as Hammering, Tempering, Normalising, Annealing, Casehardening. Recambering process of leaf springs and pre-treatment of phosphating (in cold and hot process) Galvanizing and Sheradizing process.
11. Riveting and Riveted joints (Hot and Cold) Practice on riveting by using Pop rivets. Aluminium (solid) Copper Rivet M.S. Rivet. Tubler Rivet and Bifurcated Rivet and its use.

Types of Rivet Guns:

(3) For Solid Rivet.

(4) For Pop Rivet.

In both cases:

(a) Manual type

(b) Pneumatic type

12. Simple welding (Gas & Electric) including brazing. Use of 'Spot Welding equipment in Sheet Metal'. Practice on Gas cutting Gas cutting of sheets. Tig and Mig welding. Practice on Arc Welding types such as: (1) Vertical downward, (2) Vertical upward, (3) Horizontal welding positions and cutting practice. Types of Electrodes, checking of good quality electrodes, cutting rods and metal sprays.
14. Marking out as per drawing and cutting off sheet metal by using hand lever shears and Nibbling shears.
15. Soldering, Tinning and Brazing and simple sheet metal operations such as Bending, Rolling, Shaping, Flanging, Edging, Hollowing, reinforcement of sheet metal components.

16. Allied forming and cutting operations such as Folding Flaring and Trepanning.
17. Annealing of copper, Cutting, Bending and Soldering of copper tubes.
18. Use of hand operated machines such as Guillotine shearing Machine. Grooving M/C, Folding M/C, Turning M/C, Wiring M/C, Beading M/C, Circle cutting M/C, Pillar type drilling M/C, Fly press Nibbling M/C, Flat cutting M/C with channels and angles and practice in bending square-tube and hat sections for roof stick and side pillar manually and pneumatically.
19. Introduction of F.R.P. materials and method of fabricating of components and its salient feature.

## **B. BLOCK – II**

1. Instructions in Safety precautions on the Shop Floor and Environmental standards.
2. Practice in use of machines utilized in Motor Vehicle Body Building work such as Power Hacksaw, Folding, Shearing, Punching, Notching, Pipe bending, Nibbling, Square tube bending, Power press. Press brakes and different types of Drilling machines.
3. Making components and sub-assembly mounted on chassis.
4. Bending body angle, mudguard angle and wheel arch angle or tube.
5. Assembling and body angles and front and rear structure on main frame and welding.
6. Cutting and providing gussets on joints and corners and reinforcing weak areas.
10. Making and fitting sub-assemblies like footsteps, battery box. luggage carrier, brackets, ladder, diesel tank brackets, front and rear structure, bonnet structure and dash board structure.
11. Making jigs and fixture for items like :
  - (a) Handles
  - (b) Passenger seat frames
  - (c) Centre posts
  - (d) Front and Rear structure for different types of bodies.
  - (e) Ladder
  - (f) Wheel arch
  - (g) Body arch angle
  - (h) Body side kit
  - (i) Assembly fixture
  - (j) Floor Assembly fixture
13. Balancing entire body structure. Method of mounting the body on chassis with suitability of chassis numbers. (Before taking body construction). Method of checking alignment for the body structure with the help .of lead screw jack levelling of chassis use of hoist.
14. Making fixing and aligning driver door, emergency door and other doors with hinges.
15. Making and fixing drivers cabin frame and partition.
16. Cutting, Pressing, Bending and Forming panels for right/left side, rear, front and roof panels and bumper.
17. Bending door frames and panelling.
18. Forming of glass frames, front cowl, grillwork, routeboard-frames, inner mudguard and hanging mudguards. Windshield and glass panel - beading, gluing & mounting.
19. Fixing ornamental and ordinary headings and aluminium extrusions.

20. Manufacturing of different components such as curtainbox frames, locking arrangements, driver door, wheel arch boxes, battery box, route board, roof pannel, bonnet, front grill, tool box, first aid box and steps etc.
21. Panelling sheets on wooden structure or Tube structure.
22. Final fitments of seat, hand nests glasses, fan, water carrier, brackets and other accessories as per Motor Vehicle Act. Stage inspection and final inspection and Roof leakage testing.
23. Use of power operated machines such as pneumatic drilling riveting and tightening and power hammer and press tools
24. Setting machines for production work. Roof leak test.
25. Spray Painting (Metallic, Enamel, Wrinkle, Hammer-tone finish) Red Oxide and Etch Primer)
26. Perform TPM (Total Productive Maintenance), TQM (Total Quality Management) and record keeping system.

## **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 above 75%- 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)**

<b>SUBJECTS</b>	<b>Marks</b>	<b>Sessional Marks</b>	<b>Full Marks</b>	<b>Pass Marks</b>	<b>Duration of Exam.</b>
Practical	300	100	400	240	<b>08 hrs.</b>
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.
<b>Grand Total</b>	<b>550</b>	<b>150</b>	<b>700</b>	<b>-</b>	

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

## 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. Automobile and allied industries
3. Service industries like road transportation and Railways.
4. Ship building and repair
5. In public sector industries (Central and State) and private industries in India & abroad.
6. Self employment



**TOOLS & EQUIPMENT FOR BASIC TRAINING****INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL  
KNOWLEDGE****TRADE: MOTOR VEHICLE BODY BUILDER****LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES****A : TRAINEES TOOL KIT:-**

<b>Sl. No.</b>	<b>Name of the items</b>	<b>Quantity (indicative)</b>
1.	Steel Rule 300 mm	16 Nos.
2.	Wing Divider 200 mm	16 Nos.
3.	Centre Punch 100 mm	16 Nos.
4.	Spring Dividers 150 mm	16 Nos.
5.	Ordinary Wooden Mallet	16 Nos.
6.	Soldering Copper Hatchet Type 0.25 kg	16 Nos.
7.	Cross Peen Hammer 0.25 kg with handle	16 Nos.
8.	Protractor with blade 150mm	16 Nos.
9.	Steel tape 2 metres	16 Nos.
10.	Ballpene hammer 0.5kg with handle	16 Nos.
11.	Scriber 150 mm x 3 mm (Engineer's)	16 Nos.
12.	Prick punch 100mm	16 Nos.

**B : TOOLS INSTRUMENTS AND GENERAL SHOP OUTFITS**

<b>Sl. No.</b>	<b>Name of the items</b>	<b>Quantity (indicative)</b>
13.	Steel Square 450 mm x 600 mm	4 Nos.
14.	Sheet Metal Gauge	1 No
15.	Hatcher Stake	4 Nos.
16.	Stake Round and Bottom	4 Nos.
17.	Half Moon Stake	4 Nos.
18.	Funnel Stake	4 Nos.

19.	Anvil Face Stake	4 Nos.
20.	Bick Iron Stake	4 Nos.
21.	Tinman's Horse	2 Nos.
22.	Hammer Peaning with handle	4 Nos.
23.	Hammer Creasing with handle	4 Nos.
24.	Hammer Planishing with handle	4 Nos.
25.	Hammer Block with handle	2 Nos.
26.	Shear Tinman 300mm	8 Nos
27.	Snip straight	8 Nos
28.	Right cut snips 250mm	4 Nos
29.	Left cut snips 250mm	4 Nos
30.	Hand Shear Universal 250 mmID	4 Nos.
31.	Hollow Punch set Round 3 mm Dia	2 Nos.
32.	Rivet sets snap and Dolly combined 3 mm	4 Nos.
33.	Chisel cold flat 25 mm x 250 mm .	4 Nos
34.	Punch Letter 4 mm	1 set
35.	Punch Number 4 mm	1 set
36.	File flat 250 mm second cut	2 Nos.
37.	File flat 250 mm smooth	2 Nos.
38.	File flat 300 mm bastard	2 Nos.
39.	File half round 300 mm smooth	2 Nos.
40.	Hacksaw frame 300 mm adjustable (Tubular)	4 Nos.
41.	Hand Groover 5 mm	4 Nos.
42.	Plier.Combination 150 mm	2 Nos.
43.	Grip Wrench 200 m mID	2 .Nos.
44.	Ladle 150 mm Dia.	2 Nos
45.	Blow Lamp 1 litre.	2 Nos
46.	H.S.S. Twist Drill 3 mm, 4 mm & 6 mm each (parallel Shank)	3 Nos.
47.	Hand Drill machine 0 to 12 mm	2 Nos.
48.	Soldering Copper Hatchet type 500 gms.	8 Nos
49.	Pneumatic rivet gun	2 Nos.
50.	Trammel Point (with beam 600 mm)	1 No.
51.	Vernier caliper (0 mm - 150 rom)	1 No
52.	Micrometer Outside (0 to 25 mm)	1 No.
53.	File Rasp cut 250 mm	2 Nos.
54.	D.E. Spanner G.P. (6 mm to 32 mm) (Set of 12 spanner)	2 Set
55.	Bossing Mallet	4 Nos
56.	End tacked Mallet	4 Nos
57.	Soft hammer (Brass, copper, Lead)	4 Nos
58.	Steel Rule 600mm	4 Nos
59.	Oilcan pressure feed 500ml	2Nos
60.	Raising hammer with handle	4 Nos
61.	Rawl Punch holder and bits (No.8, 10, 12, 14)	2 . Sets
62.	Hollowing Hammer with handle	4 Nos.
63.	Tripaning tool 70 mm	1 No.
64.	Hand vice 50 mm	4 Nos.
65.	Tongs Flat	2 Pairs.
66.	Portable Electric drill (Single phase) -6mm	2 Nos
67.	Pop rivet gun	2 Nos.
68.	Lazy Tong	2 Nos.

69.	Screw Driver 250 mm	2 Nos.
70.	Round File 2nd Cut 250 mm	4 Nos.
71.	Triangular File 'Smooth 250 mm	4 Nos.
72.	Square File 2nd Cut 250 mm.	4 Nos.
73.	Needle File (Swiss File) 150 mm	1 set
74.	C Clamp 150 mm	2 Nos.

### **C : GENERAL MACHINERY INSTALLATIONS:-**

<b>Sl. No.</b>	<b>Name &amp; Description of Machines</b>	<b>Quantity (indicative)</b>
1.	Bench leaver shears 250 mm Blade x 3mm Capacity	1 No.
2.	Air Compressor (Pressure and displacement of air) Pneumatic Pop rivet Gun	1 . No
3.	Spray Gun(painting) 500 ml.	1 No.
4.	Combination turning up and wiring machine	1 No.
5.	Guillotine. Shearing Machine foot operated	1 No.
6.	Oxy acetylene welding plant (complete set)	1 set
7.	Circle cutting machine 300 mm dia	1 set
8.	Pillar type drilling machine 12 mm	1 No.
9.	Slip roll former 1.6. mm x 1000 mm	1 No.
10.	D.E. Grinder Pedestal motorised 200 mm	1 No.
11.	Anvil 50 kgs with Stand	1 No.
12.	Bench vice 120 mm, 150 mm	2 each
13.	Fly press Ball press No.4 single body	1 No.
14.	Power Press 2 Tons	1 No.
15.	Buffing and Polishing Machine	1 No.
16.	Nibbling Machine	1 No.
17.	Spinning Lathe	1 No.
18.	Seaming Machine .	1 No.
19.	Glass cutter - Diamond point	1 No.
20.	Work Bench 1820 x 1310 x 760 mm	4 Nos.
21.	Almirah 1820 x 1210 x 450 mm	2 Nos.

22.	Metal rack 1820 x-1520 x 450 mm	2 Nos.
23.	Steel Lockers with 8 Drawers .	2 Nos.
24.	Fire extinguisher Soda Acid and foam type	1 each
25.	Fire buckets with Stand-	4, Nos.
26.	Black Board with Easel .	1 No.
27.	Wooden Stool 450.mm.	1 No.
28.	Portable Nibbler	2 Nos.
29.	Portable Pneumatic Shear.	2 Nos.
30.	Pipe Bending Machine (Hydraulic Type) 12 mm to 30 mm	1 No.
31.	Hand Press Brake Capacity (0.8 mm)	1 No.
32.	Beading Machine with 380 mm throat clearance (with crimping rollers)	1 No.
33.	Tin . smiths bench folder 600 x 1.6 mm	1 No.
34.	Gas Welding Table 1220 mm x 760 mm	1 No.
35.	Spot Welding Machine	1 No.
36.	Arc welding Transformer/ Rectifier/Inverter 300Amps with accessories	1 set
37.	Co <sub>2</sub> welding machine complete set 300Amps	1 set
38.	TIG welding machine complete set 200 Amps	1 set
39.	Universal cutting machine	1 No.

**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: MOTOR VEHICLE BODY BUILDER**

**LIST OF TOOLS& EQUIPMENTS FOR 20 APPRENTICES**

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

2) **Infrastructure:**

**A : TRAINEES TOOL KIT:-**

<b>Sl. No.</b>	<b>Name of the items</b>	<b>Quantity (indicative)</b>
1.	Draughtsman drawing instrument box	20 Nos.
2.	Set square celluloid 45 <sup>0</sup> (250 X 1.5 mm)	20 Nos.
3.	Set square celluloid 30 <sup>0</sup> -60 <sup>0</sup> (250 X 1.5 mm)	20 Nos.
4.	Mini drafter	20 Nos.
5.	Drawing board (700mm x500 mm) IS: 1444	20 Nos.

**B : FURNITURE REQUIRED**

<b>Sl. No.</b>	<b>Name of the items</b>	<b>Quantity (indicative)</b>
1	Drawing Board	20 Nos.
2	Models : Solid & cut section	as required
3	Drawing Table for trainees	as required
4	Stool for trainees	as required
5	Cupboard (big)	as required
6	White Board (size: 8ft. x 4ft.)	as required
7	Trainer's Table	as required
8	Trainer's Chair	as required

**INFRASTRUCTURE FOR ON-JOB TRAINING**

**TRADE: MOTOR VEHICLE BODY BUILDER**

**For Batch of 20 APPRENTICES**

Actual training will depend on the existing facilities available in the establishments. 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 concern industry may impart the training in cluster mode/ any other industry/ at ITI.

**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.