# CURRICULUM

# FOR THE TRADE OF

# BAR BENDER & STEEL FIXER

# UNDER

# APPRENTICESHIP TRAINING SCHEME

**GOVERNMENT OF INDIA**

**MINISTRY OF SKILL DEVELOPMENT AND ENTREPRENEURSHIP**

**DIRECTORATE GENERAL OF TRAINING**

**1. Category of trade** : Non-Engineering

**2. Name of the Trade** :BarBender&SteelFixer

**3. Duration of Apprenticeship Training** : **24 Months**

***Break up of the Apprenticeship Training***

**(i) Duration of Basic Training** : 6 (3+3) months / 1200 Hrs

**(ii) Duration of Practical Training/ On-the-job Training** : 18 (9+9) Months

**4. Entry Qualification** : **5th Pass**

**(A) <u>Basic training components</u>**

(i) Employability Skills – 110

(ii) Basic numeracy - 50

(iii) Trade theory - 120+120Hrs

(iv) Trade practical - 400+400Hrs

(B **Practical Training/On-the job training** : 18 Months

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# 1. ACKNOWLEDGEMENT

L&T Construction Corporate Centre, HQ, sincerely acknowledges with thanks the contribution and cooperation extended by the Construction Skills Training Institutes and project sites of L&T projects, Trade Experts, Subject Matter Experts and all others to bring out this curriculum for the trade of **Bar Bender & Steel Fixer (under structural framework building)** under Apprenticeship Training Scheme.

Special acknowledgement to the following departments in L&T Construction who have contributed valuable inputs in bringing out this curriculum through their expert members:

1. Competency Development Centre
2. Skills training institutes Facilities & Management Team
3. Principals and Master Trainers
4. Subject Matter Experts from respective department
5. VACUM (Vocational Curriculum) Development team of L&T Construction Skills Training Department

## 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**; tradeapprentice, 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 as Storage and Inventory Executive]

In a construction industry, the identification and selection of most important construction trades, which covers almost 80% of the construction work activities. These trades cover Bar bending, Masonry, Formwork, Plumbing, Finishing-Tiling, Lab Technician, Surveyor, Electrician, Welding, CCTV, Optical Fibre Cable (OFC) and all sectorial activities. It will covers the Construction, Installation & Surveillance and Infrastructure industries.

The greater degree of relevance of the training with latest advancements of the industry will enhance the employability opportunities.

- Identify,selectandusethebasicbarbendingandsteelfixinghandtools,materials,consumables and smallequipments.
- Usepersonnelprotectivesafetyequipments
- Disposewaste/debris andperformgoodhousekeeping
- StackSteelrods
- SelectandStraightenSteelrods
- Measure, markand CutSteelrods
- BindSteelrodswithappropriatetype ofTie.
- BendLinksandHooks
- BendCranks,LapsShearbarsandChairs:
- PrefabricatePre-castElements(Slabs)
- PrefabricatecageforBeams

- PrefabricatecageforColumnandbaseandsetinposition

- Prefabricateandsetin-situcageforStaircase

## 4. JOB ROLE

**Brief description of Job role:**

Bar Bender & Steel Fixer Trade is one of the basic trade in Construction Industry which is common to all type of Constructions and has variance with respect to specificrequirements of the Project.

Brief Job Description of Bar Bender & Steel Fixer: A Bar Bender & Steel Fixer should be able to identify types of bars, read drawings and prepare schedules, fabricate using hand and power tools, store transport and fix reinforcement in position in formwork in readiness for concrete pours. Should strictly practice safety norms and precautions.

## 5. LEARNING OUTCOMES

### A. GENERIC OUTCOME

- Recognize & comply safe working practices, environment regulation and housekeeping.
- Work in a team, understand and practice soft skills, technical English to communicate with required clarity.
- Understand and explain the concept in quality tools and labour welfare legislation and apply such in day to day work to improve productivity & quality.
- Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
- Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
- Understand and apply basic computer working, basic operating system and uses internet services to get accustomed & take benefit of IT developments in the industry.

### B. SPECIFIC OUTCOME

The Trainees will be able to

- Identify, select and use the basic bar bending and steel fixing hand tools, materials, consumables and small equipments.
- Use personnel protective safety equipments
- Dispose waste / debris and perform good housekeeping
- Stack Steel rods
- Select and Straighten Steel rods
- Measure , mark and Cut Steel rods
- Bind Steel rods with appropriate type of Tie.
- Bend Links and Hooks
- Bend Cranks, Laps Shear bars and Chairs:
- Prefabricate Pre-cast Elements (Slabs)
- Prefabricate cage for Beams
- Prefabricate cage for Column and base and set in position
- Prefabricate and set in-situ cage for Stair case

## 6. GENERAL INFORMATION

| | | | |
|---|---|---|---|
| **1.** | Name of the Trade | : | Bar Bender & Steel Fixer |
| **2.** | Duration of Apprenticeship Training | : | 24 Months |
| | Basic Training | : | 6 Months |
| | Practical Training | : | 18 Months |
| **3.** | Duration of Basic Training | : | |
| | a. Block –I | : | 3 months |
| | b. Block II | : | 3 months |
| **4.** | Total duration of Basic Training | : | 6 Months |
| **5.** | Duration of Practical Training (On -job Training) | : | 18 Months |
| **6.** | Entry Qualification | : | $5^{th}$ Pass |
| **7.** | Selection of Apprentices | : | The apprentices will be selected asper Apprenticeship Act amended time to time. |
| **8.** | Rebate for ITI passed trainees | : | NA |

***Note:*** *Industry may impart training as per above time schedule, 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 aspect is compromised and duration of industry training to be remains as 1 year.*

## 7. COURSE STRUCTURE

**Training duration details:-**

| **Time (in months)** | **1-3** | **4-12** | **13-15** | **16-24** |
|---|---|---|---|---|
| **Controlled Condition training** | Part A | ------- | Part B | ------ |
| **On-job training** | ----- | Part A | ------ | Part 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 |
| **Controlled Condition Training Part A** | | | | | | | | | | | | | | | | | | | | | | | | |
| **On Job Training, Part A** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Controlled Condition Training Part B (@ site)** | | | | | | | | | | | | | | | | | | | | | | | | |
| **On Job Training, Part B** | | | | | | | | | | | | | | | | | | | | | | | | |

# 8. SYLLABUS

## 8.1 BASIC TRAINING

## (Part – I& II)

## DURATION: 06 MONTHS

## GENERAL INFORMATION

| | | | |
|---|---|---|---|
| 1) | Name of the Trade | : | Bar Bender & Steel Fixer |
| 2) | Hours of Instruction | : | 800 Hrs. |
| 3) | Batch size | : | 20 |
| 4) | Power Norms | : | NA |
| 5) | Space Norms | : | NA |
| 6) | Examination | : | The internal assessment will be held on completion of each Part. |
| 7) | Instructor Qualification | : | |

a) Degree/Diploma in Engineering or Masters from recognized university/Board with one/two year post qualification experience respectively in the relevant field.

8)Tools, Equipment's & Machinery required: - As per Annexure – I

## 8.1.1 Details of Syllabus of Core Skill

**COURSECONTENTS:-**

| **IntroductiontoBasicCompetencies** |
|---|
| • IntroductiontoTrade anddutiesof “Assistant Bar BenderandSteelfixer”<br>• Occupational healthhazards,Personal ProtectiveEquipment’s(PPE)usageandworkingat heights<br>• Introduction,Handling,StoringandMaintenanceofTools,Materials,ConsumablesandSmallEquipment’s<br>• Understandingtolerancelimits,MeasuringinMKSsystem,fieldtestingofMaterialsandConsumables |

**Controlled Condition Training (Part A and Part B)**

**Duration: 6 Months (3 Month in each part)**

**Controlled Condition Training, Part A: 3 Months**

| PracticalCompetencies | UnderpinningKnowledge(Theory) |
|---|---|
| **StackingofSteel:**<br>• Manuallyhandle , transport andStacksteel | • Safety precaution while handling andtransporting steelmanually<br>• Classification beforestacking<br>• Methods ofStorageofsteelatworkplace. |
| **Selection&StraighteningofSteel:**<br>• Identification and straighteningofsteelfrom coils | • Typesofsteelandidentification<br>• Use ofcuttinglist<br>• Basicmeasurement<br>• Markingout<br>• UseofStraighteningtools |

| | |
|---|---|
| **CuttingofSteel:**<br>• Use cuttinglist ,Measure , markandcutsteel | • Use ofcuttinglist<br>• Basicmeasurement<br>• Markingout<br>• Use ofcuttingtools<br>• Safetyprecautionwhilecuttingrods |
| **Ties:**<br>• Bind steelrodswithdifferent typesof ties. | • Typesofties<br>• Use ofcuttinglist<br>• Basicmeasurement<br>• Markingout<br>• Typesofbindingwires |
| **BendingLinksandHooks:**<br>• Preparehooks, andlinks | • Typesofhooks, Links<br>• Basicmarkingout<br>• Use offormulae<br>• Use ofhandtools<br>• Selection offormers<br>• Setupbar bendingarrangements<br>• Awarenessoftolerance |

| | |
|---|---|
| **BendingCranks,LapsShearbarsandChairs:**<br><br>• Preparecrankslaps, shearbarsandchairs | • Typesofchairs.<br>• Purpose ofLaps,shearbars, chairs<br>• Basicmarkingout<br>• Use offormulae<br>• Use ofhandtools<br>• Sequenceoffabrication<br>• Selection offormers<br>• Setupbar bendingarrangements<br>• Awarenessoftolerance |
| **PrefabricatePre-castElements (Slabs)**<br><br>Frompre-castdrawingsandscheduletoformmatswithendshooksandtieonmouldsasperschedulestoatoleranceof□□5mm.Allbendstobeinflatplane. | • Read&understandprecast drawings &schedule<br>• Interpretnumberofrepetitions, mirrorimages<br>• Sequenceoffabrication<br>• Formmats withendhooks<br>• Understandtolerance<br>• Safety<br>• Site tidiness |
| **Prefabricatecageforbeams**<br><br>Fromsimpledrawingandscheduleselect,cutandbendsteeltogivendimensionandfrompageforbeam,usingclosedfoursidedstirrups,allbarsasperdrawingtoatoleranceof□□5mm.Linkstobetight(Cannot bemovedbyhand). | • Read &understand drawings&schedule<br>• Basicmarkingout<br>• Use ofhandtools<br>• Selection offormers<br>• Sequenceoffabrication<br>• Formmats withendhooks<br>• Usingclosedfoursidedstirrups<br>• Understandtolerance<br>• Safety<br>• Site tidiness |

**Controlled Condition Training, Part B: 3 Months**

| PracticalCompetencies | UnderpinningKnowledge(Theory) |
|---|---|
| **Prefabricatecagefor columnandbaseand setintoposition**<br>Fromdrawing/schedule.Select,cutandbendsteeltogivendimension,makeupsetupin-situ,allbarsasperdrawing□□5mm.Baseandstarterbarsrigid,alltiestight. | • Read &understand drawings&schedule<br>• Basicmarkingout<br>• Use ofhandtools<br>• Selection offormers<br>• Sequenceoffabrication<br>• Formcagefor column<br>• Usingbase&starter bars<br>• Understandtolerance<br>• Safety<br>• Site tidiness |
| **Prefabricatecagefor columnincorporatingcorbels**From drawing /schedule.Select,cut and bendsteel togiven dimension, make up set upin-situ,allbarsasperdrawing□□5mm.Baseandstarter barsrigid, allties tight. | • Read &understand drawings&schedule<br>• Basicmarkingout<br>• Use ofhandtools<br>• Selection offormers<br>• Sequenceoffabrication<br>• Formcagefor column<br>• Usingbase&starter bars<br>• Understandtolerance<br>• Safety<br>• Site tidiness |
| **Prefabricatecagefor columnincorporatingcrankbars**<br>From drawing /schedule.Select,cut and bendsteel togiven dimension, make up set upin-situ,allbarsasperdrawing□□5mm.Baseandstarter barsrigid, alltiestight. | • Read &understand drawings&schedule<br>• Basicmarkingout<br>• Use ofhandtools<br>• Selection offormers<br>• Sequenceoffabrication<br>• Formcagefor column<br>• Usingbase&starter bars<br>• Understandtolerance<br>• Safety<br>• Site tidiness |

| | |
|---|---|
| **Prefabricateandset in-situcageforstaircase**Fromdrawing/ schedule.Select,cutandbendsteeltogivendimension, makeupandsetupin-situ,requiredangle,slopeallbarsasperdrawing□5mm. Baseandstarterbars rigid, all tiestight. | • Read &understand drawings&schedule<br>• Basicmarkingout<br>• Useofhandtools<br>• Selection offormers<br>• Sequenceoffabrication<br>• Introduction ofnewbars<br>• Understandrequirementoflaps<br>• Understandrequired angleandslope<br>• Usingbase&starter bars<br>• Measureand cut laplength<br>• Understandtolerance<br>• Safety<br>• Site tidiness |

## 8.1.2 EMPLOYABILITY SKILLS

### GENERAL INFORMATION

1) **Name of the subject** : **EMPLOYABILITY SKILLS**

2) **Applicability** : ATS- Mandatory for fresher only

3) **Hours of Instruction** : 110 Hrs.

4) **Examination** : The examination will be held at the end of two years Training by CSDCI.

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 $12^{th}$ /diploma level

OR

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

## 8.1.3 SYLLABUS OF EMPLOYABILITY SKILLS

### Basic Training

| Topic No. | Topic | Duration (in hours) |
|---|---|---|
| | **English Literacy** | **20** |
| **1** | **Pronunciation :**<br>Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech) | |
| **2** | **Functional Grammar**<br>Transformation of sentences, Voice change, Change of tense, Spellings. | |
| **3** | **Reading**<br>Reading and understanding simple sentences about self, work and environment | |
| **4** | **Writing**<br>Construction of simple sentences Writing simple English | |
| **5** | **Speaking / Spoken English**<br>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** | |

| | | |
|---|---|---|
| **1** | **Basics of Computer**<br>Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer. | **20** |
| **2** | **Computer Operating System**<br>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**<br>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.<br>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**<br>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),<br>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.<br>Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes. | |
| | **Communication Skill** | |

| | | |
|---|---|---|
| **1** | **Introduction to Communication Skills**<br>Communication and its importance<br>Principles of Effective communication<br>Types of communication - verbal, non verbal, written, email, talking on phone.<br>Non verbal communication -characteristics, components-Para-language<br>Body - language<br>Barriers to communication and dealing with barriers.<br>Handling nervousness/ discomfort. | **15** |
| **2** | **Listening Skills**<br>Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.<br>Triple- A Listening - Attitude, Attention & Adjustment.<br>Active Listening Skills. | |
| **3** | **Motivational Training**<br>Characteristics Essential to Achieving Success<br>The Power of Positive Attitude<br>Self awareness<br>Importance of Commitment<br>Ethics and Values<br>Ways to Motivate Oneself<br>Personal Goal setting and Employability Planning. | |
| **4** | **Facing Interviews**<br>Manners, Etiquettes, Dress code for an interview<br>Do's & Don'ts for an interview | |
| **5** | **Behavioral Skills**<br>Problem Solving<br>Confidence Building<br>Attitude | |

| Topic No. | Topic | Duration (in hours) |
|---|---|---|
| | **Entrepreneurship skill** | **15** |
| 1 | **Concept of Entrepreneurship**<br>**Entrepreneurship** - Entrepreneurship - Enterprises:- Conceptual issue<br>Entrepreneurship vs. Management, Entrepreneurial motivation. Performance & Record, Role & Function ofentrepreneurs 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**<br>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**<br>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**<br>Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes. | |
| | **Productivity** | |
| 1 | **Productivity**<br>Definition, Necessity, Meaning of GDP. | |

| | | |
|---|---|---|
| 2 | **Affecting Factors**<br>Skills, Working Aids, Automation, Environment, Motivation<br>How improves or slows down. | **10** |
| 3 | **Comparison with developed countries**<br>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**<br>Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance. | |
| | **Occupational Safety, Health & Environment Education** | **15** |
| 1 | **Safety & Health**<br>Introduction to Occupational Safety and Health importance of safety and health at workplace. | |
| 2 | **Occupational Hazards**<br>Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention. | |
| 3 | **Accident & safety**<br>Basic principles for protective equipment.<br>Accident Prevention techniques - control of accidents and safety measures. | |
| 4 | **First Aid**<br>Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person | |
| 5 | **Basic Provisions**<br>Idea of basic provision legislation of India.<br>of safety, health, welfare under legislation of India. | |
| 6 | **Ecosystem**<br>Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance. | |

| | | |
|---|---|---|
| 7 | **Pollution**<br>Pollution and pollutants including liquid, gaseous, solid and hazardous waste. | |
| 8 | **Energy Conservation**<br>Conservation of Energy, re-use and recycle. | |
| 9 | **Global warming**<br>Global warming, climate change and Ozone layer depletion. | |
| 10 | **Ground Water**<br>Hydrological cycle, ground and surface water, Conservation and Harvesting of water | |
| 11 | **Environment**<br>Right attitude towards environment, Maintenance of in -house environment | |
| | **Labour Welfare Legislation** | |
| 1 | **Welfare Acts**<br>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. | **05** |
| | **Quality Tools** | |
| 1 | **Quality Consciousness :**<br>Meaning of quality, Quality Characteristic | |
| 2 | **Quality Circles :**<br>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. | **10** |
| 3 | **Quality Management System :**<br>Idea of ISO 9000 and BIS systems and its importance in maintaining qualities. | |
| 4 | **House Keeping :**<br>Purpose of Housekeeping, Practice of good Housekeeping. | |
| 5 | **Quality Tools**<br>Basic quality tools with a few examples | |

## 8.2BASIC NUMERACY

### GENERAL INFORMATION

6) **Name of the subject** : **BASIC NUMERACY**

7) **Applicability** : ATS- Mandatory for fresher only

8) **Hours of Instruction** : 50 Hrs.

9) **Examination** : The examination will be held at the end of two years Training by CSDCI.

10) **Instructor Qualification** :

iii) MBA/BBA with two years experience or graduate in Science and Mathematics with two years experience and trained in Basic Numeracy from DGET Institute.

And

Must have studied in Mathematics at $12^{th}$ /diploma level

## 8.2.1 SYLLABUS OF BASIC NUMERACY

### Basic Training

| Topic No. | Topic | Duration (in hours) |
|---|---|---|
| | **English Literacy** | **50 Hrs** |
| **1** | Number System/Fractions | |
| **2** | Square Root/Cube Root | |
| **3** | Average/Percentage | |
| **4** | Area Calculation- Triangles, Quadrilaterals | |
| **5** | Concept of geometry- Square, Rectangle, Circle, Triangle | |
| **6** | Basic Trigonometry | |

## 8.3 PRACTICAL TRAINING (ON-JOB TRAINING)

**(BLOCK – I& II)**

**DURATION: 18 MONTHS**

**Broad Skill Components to be covered during On-Job Training**

**On Job Training, Part A: 9 Months**

1) Stacking of Steel
2) Selection & Straightening of Steel
3) Cutting of Steel
4) Ties
5) Bending Links and Hooks
6) Bending Cranks, Laps Shear bars and Chairs:
7) Prefabricate Pre-cast Elements (Slabs)
8) Prefabricate cage for beams

**On Job Training, Part B: 9 Months**

1) Prefabricate cage for column and base and set into position
2) Prefabricate cage for column incorporating corbels
3) Prefabricate cage for column incorporating crank bars
4) Prefabricate and set in-situ cage for stair case

4.**Instructors Qualification:**

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

**OR**

**ii)** ITI in relevant trade with three year experience / 8 years' experience in the relevant field with $10^{th}$ Qualification.

**5. Infrastructure for On-Job Training**: Ongoing Project sites

# 9. ASSESSMENT STANDARD

**Assessment Guideline**

Successful achievement of the partical assesment is the professional judgement of the instructor/assessor. Failure to demonstrate the appropriate practical skills and practices to the satisfatction of the Assessor will result in a failure of the course. The following area will be consoidered.
Selection of materials, Understanding of drawing, Quality of work (Functional aspects, Dimensional features, Surface finish), Personal safety, time taken to complete the job.
If the delegate fail a couse the Training Provider must make a recommendation outline a time period required for the delegate to gain sufficient industry experinece prior to repete the course.
**A sample assessment sheet is below**

| Assessment Bar-bending trade | | | | | |
|---|---|---|---|---|---|
| **Name** | | **Batch** | **Roll No** | **Allotted Time** | |
| **S.No** | **Standards for rectangular / square links / hooks** | | **Permitted Tolerance** | OV | ASSE |
| 1. | Length of link , side – a | | ± 5 mm | | |
| 2. | Length of link ,side - b | | ± 5 mm | | |
| 3. | Breadth of link ,side – a | | ± 5 mm | | |
| 4. | Breadth of link, side – b | | ± 5 mm | | |
| 5. | Diagonal of link, – a | | ± 5 mm | | |
| 6. | Diagonal of link, – b | | ± 5 mm | | |
| 7. | Length of hook – side a | | ± 5 mm | | |
| 8. | Length of hook – side b | | ± 5 mm | | |
| 9. | Level of link | | Flat(no bent) | | |
| 10. | Linear dimension of **bent bar** | | | | |
| | 0 to 750 mm length | | + 3 mm / - 5 mm | | |
| | 750 mm to 1500 mm length | | + 5 mm / -10 mm | | |
| | 1500 mm to 2500 mm length | | + 6 mm / - 15 mm | | |
| | above 2500 mm length | | + 7 mm / - 25 mm | | |
| 11. | Date | | | | |
| 12. | Time of Commencement | | | | |
| 13. | Time of Completion | | | | |
| 14. | Time Taken | | | | |
| 15. | Overall Assessment ( Pass / Fail) | | | | |
| 16. | Demonstrator | Name | | | |
| | | Sign | | | |
| 17. | Instructor | Name | | | |

## 10. FURTHER LEARNING PATHWAYS

- On successful completion of the course trainees can opt for any charge hand/ foreman / supervisory course under CSDCI.

**Employment opportunities:**

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

1. Construction Sector

## ANNEXURE – I

## TOOLS & EQUIPMENT FOR BASIC TRAINING

## INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONALKNOWLEDGE

### TRADE: Storage and Inventory Executive (warehouse/Manufacturing plant)

## LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES

### A : TRAINEES TOOL KIT:-

| S. No. | Name of equipment and Tools | Unit | Quantity Required |
|---|---|---|---|
| **TOOLS** | | | |
| 1 | Binding Hook | No | 20 |
| 2 | Lever 8 mm | No | 20 |
| 3 | Lever 10 mm | No | 10 |
| 4 | Plumb Bob 250 gm | No | 10 |
| 5 | Nylon Line Thread | Bundle | 15 |
| 6 | Tri Square-300 mm length | No | 10 |
| 7 | Chisel - 6 " | No | 4 |
| 8 | Sledge hammer- 10 Pounds | No | 4 |
| 9 | Sledge hammer- 2 Pounds | No | 10 |
| 10 | Pin Plate - 8 mm | No | 20 |
| 11 | Measuring Tape 3m | No | 20 |
| 12 | Measuring Tape 15m | No | 1 |
| 13 | Hacksaw frame | No | 10 |
| 14 | Standard Wire Guage | No | 1 |
| 15 | PVC water level tube - 10 mm dia | Rmt | 40 |
| **EQUIPMENTS** | | | |

| | | | |
|---|---|---|---|
| 16 | Bull head Rail Piece(90lbs) 600 mm length | No | 4 |
| 17 | Bending Machine | No | 1 |
| 18 | Shear Cutting Machine | No | 5 |
| 19 | Cut-off Machine | No | 1 |
| 20 | Tying machine | No | 1 |
| 21 | Working table | No | 5 |
| **SAFETY GADGETS** | | | |
| 22 | Full Body Harness ( Safety Belt ) | No. | 20 |
| 23 | Safety helmet with Refill | No. | 20 |
| 24 | Cotton Hand Gloves | pair | 20 |
| 25 | Safety Goggles | No. | 20 |
| 26 | Shoulder Pad | No. | 20 |
| 27 | Safety Shoe | pair | 20 |
| **CONSUMABLES** | | | |
| 28 | Chalk box | Box | 10 |
| 29 | Nails 2" | Kg | 2 |
| 30 | Paint (Smoke grey) | Ltr | 5 |

**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 ON-JOB TRAINING

Actual training will be conducted at ongoing construction project sites

## ANNEXURE-II

## 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.