

Syllabus for the subject

of

# **ENGINEERING DRAWING**

(For 1<sup>st</sup> & 2<sup>nd</sup> semester)

Under

**CRAFTSMAN TRAINING SCHEME (CTS)**

(For all Engineering Trades duration)

Re-Designed in

- 2014 -

By

**Government of India  
Ministry of Labour & Employment  
Directorate General of Employment & Training  
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE  
Block - EN - 81 SECTOR – V, SALT LAKE CITY,  
KOLKATA – 700 091**

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## A. RATIONALE

Core skills enhance knowledge, analytical ability, problem solving ability, understanding or comprehending scientific principles and drawings & designs also. At the same time it creates the base for achieving Hard skills. To carry out any skill related task knowledge about basic Engineering Drawing is essential as *drawing is the language of engineers*.

Knowledge of Engineering Drawing complements the skills of an Artisan / Trade person. More importantly, ability to read drawing increases the productivity of a person besides enhancing confidence to perform task competently.

Recognising this importance the core skills (Engineering Drawing) made an integral part of all Engineering Trades under NCVT.

The content of Engineering Drawing is common for first two semesters for all Engineering Trades having more than two semesters. The contents of 3<sup>rd</sup> & 4<sup>th</sup> semester are made trade specific to fulfill the requirement of each trade.

## **B. GENERAL INFORMATION**

1. **Name of the Subject :** ENGINEERING DRAWING

2. **Applicability :**

- CTS- For all engineering trades duration
- ATS- For all engineering trades

3. **Hours of Instruction:** 44 Hrs for 1<sup>st</sup> semester  
42 rs for 2<sup>nd</sup> semester

4. **Examination pattern :**

- The examination for the subject will be held at the end of each semester.
- The examination of 1<sup>st</sup> Semester is **Multiple Choice Question Type**

5. **Marks Distribution :**

	Full marks	Pass Marks
Examination	50	20
Sessional	20	8
TOTAL	70	28

6. **Instructor Qualification:** Degree in Engineering with one year experience  
**OR**

Diploma in Engineering with two years experience

**OR**

NCVT / NAC in the Draughtsman (Mechanical / Civil)  
with three years experience.

7. **Desirable:** Craft Instructor Certificate in RoD & A course under NCVT.

8. **Instructor:**

- One full time instructor is required for 1000 seats and above
- For seats less than 1000, the instructor may be out sourced/ hired on contract basis.

**C. ALLOTMENT OF TIME AND MARKS AMONG THE TOPICS**

	<u>Workshop Calculation</u>			<u>SESSIONAL</u>	<u>GRAND TOTAL</u>
<b>To be covered in</b>	<b>Topics</b>	<b>Allotted time in Hours</b>	<b>Marks Allotted</b>		
<b>First semester</b>	Introduction and its importance	<b>2</b>	<b>4</b>		
	Drawing Instruments - their Standard and uses	<b>2</b>	<b>4</b>		
	Lines	<b>3</b>	<b>4</b>		
	Drawing of Geometrical Figures	<b>8</b>	<b>8</b>		
	Lettering and Numbering	<b>8</b>	<b>8</b>		
	Dimensioning	<b>3</b>	<b>4</b>		
	Free hand drawing	<b>6</b>	<b>6</b>		
	Sizes and Layout of Drawing Sheets	<b>6</b>	<b>4</b>		
	Method of presentation	<b>3</b>	<b>4</b>		
	Symbolic Representation	<b>3</b>	<b>4</b>		
	<b>TOTAL:</b>	<b>44</b>	<b>50</b>		
<b>Second semester</b>	Construction of Scales and diagonal scale	03	<b>4</b>		
	Practice of Lettering and Title Block	03	<b>4</b>		
	Dimensioning practice	03	<b>4</b>		
	Construction of Geometrical Figures	06	<b>4</b>		
	Drawing of Solid figures	06	<b>4</b>		
	Free Hand sketch of hand tools and measuring tools used in respective trades	06	<b>6</b>		
	Projections	03	<b>4</b>		
	Drawing of Orthographic projection of blocks	06	<b>4</b>		
	Orthographic Drawing of simple fastener	03	<b>8</b>		
	Drawing simple details and assembled view	03	<b>8</b>		
<b>TOTAL:</b>	<b>42</b>	<b>50</b>	<b>20</b>	<b>70</b>	

## **D. DETAILS OF SYLLABUS**

### **SYLLABUS OF ENGINEERING DRAWING FOR 1<sup>ST</sup> SEMESTER– 44 hrs. Duration**

<b>Sl. No.</b>	<b>Topics</b>	<b>Duration</b>
1.	Engineering Drawing: Introduction and its importance <ul style="list-style-type: none"><li>- Relationship to other technical drawing types</li><li>- Conventions</li><li>- Viewing of engineering drawing sheets.</li><li>- Method of Folding of printed Drawing Sheet as per BIS SP:46-2003</li></ul>	2 hrs.
2.	Drawing Instruments : their Standard and uses <ul style="list-style-type: none"><li>- 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.</li></ul>	2 hrs.
3.	Lines : <ul style="list-style-type: none"><li>- Definition, types and applications in Drawing as per BIS SP:46-2003</li><li>- Classification of lines (Hidden, centre, construction, Extension, Dimension, Section)</li><li>- Drawing lines of given length (Straight, curved)</li><li>- Drawing of parallel lines, perpendicular line</li><li>- Methods of Division of line segment</li></ul>	3 hrs.
4.	Drawing of Geometrical Figures: Definition, nomenclature and practice of <ul style="list-style-type: none"><li>- Angle: Measurement and its types, method of bisecting.</li><li>- Triangle -different types</li><li>- Rectangle, Square, Rhombus, Parallelogram.</li><li>- Circle and its elements.</li></ul>	8 hrs.
5.	Lettering and Numbering as per BIS SP46-2003: <ul style="list-style-type: none"><li>- Single Stroke, Double Stroke, inclined, Upper case and Lower case.</li></ul>	8 hrs.
6.	Dimensioning: <ul style="list-style-type: none"><li>- Definition, types and methods of dimensioning (functional, non-functional and auxiliary)</li><li>- Types of arrowhead</li><li>- Leader Line with text</li></ul>	3 hrs.
7.	Free hand drawing of <ul style="list-style-type: none"><li>- Lines, polygons, ellipse, etc.</li><li>- geometrical figures and blocks with dimension</li><li>- Transferring measurement from the given object to the free hand sketches.</li></ul>	6 hrs.
8	Sizes and Layout of Drawing Sheets <ul style="list-style-type: none"><li>- Basic principle of Sheet Size</li><li>- Designation of sizes</li><li>- Selection of sizes</li><li>- Title Block, its position and content</li><li>- Borders and Frames (Orientation marks and graduations)</li><li>- Grid Reference</li><li>- Item Reference on Drawing Sheet (Item List)</li></ul>	6 hrs.
9.	Method of presentation of Engineering Drawing <ul style="list-style-type: none"><li>- Pictorial View</li><li>- Orthogonal View</li><li>- Isometric view</li></ul>	3 hrs.
10.	Symbolic Representation (as per BIS SP:46-2003) of : <ul style="list-style-type: none"><li>- Fastener (Rivets, Bolts and Nuts)</li></ul>	3 hrs.

	<ul style="list-style-type: none"> <li>- Bars and profile sections</li> <li>- Weld, brazed and soldered joints.</li> <li>- Electrical and electronics element</li> <li>- Piping joints and fittings</li> </ul>	
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**SYLLABUS OF ENGINEERING DRAWING FOR 2<sup>nd</sup> SEMESTER– 42 hrs. Duration**

<b>Sl. No.</b>	<b>Topics</b>	<b>Duration</b>
1.	Construction of Scales and diagonal scale	3 hrs.
2.	Practice of Lettering and Title Block	3 hrs.
3.	Dimensioning practice: <ul style="list-style-type: none"> <li>- Position of dimensioning (unidirectional, aligned, oblique as per BIS SP:46-2003)</li> <li>- Symbols preceding the value of dimension and dimensional tolerance.</li> <li>- Text of dimension of repeated features, equidistance elements, circumferential objects.</li> </ul>	3 hrs.
4.	Construction of Geometrical Drawing Figures: <ul style="list-style-type: none"> <li>- Different Polygons and their values of included angles. Inscribed and Circumscribed polygons.</li> <li>- Conic Sections (Ellipse &amp; Parabola)</li> </ul>	6 hrs.
5.	Drawing of Solid figures (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.	6 hrs.
6.	Free Hand sketch of hand tools and measuring tools used in respective trades.	6 hrs.
7.	Projections: <ul style="list-style-type: none"> <li>- Concept of axes plane and quadrant.</li> <li>- Orthographic projections</li> <li>- Method of first angle and third angle projections (definition and difference)</li> <li>- Symbol of 1<sup>st</sup> angle and 3<sup>rd</sup> angle projection as per IS specification.</li> </ul>	3 hrs.
8.	Drawing of Orthographic projection from isometric/3D view of blocks	6 hrs.
9.	Orthographic Drawing of simple fastener (Rivet, Bolts, Nuts & Screw)	3 hrs.
10.	Drawing details of two simple mating blocks and assembled view.	3hrs.

### **E. LIST OF TOOLS & EQUIPMENTS**

<b>Sl. No.</b>	<b>NAME OF TOOLS / EQUIPMENTS</b>	<b>QUANTITY</b>
1	Drawing Board	20
2	Models : Solid & cut section	as required
3	Table for trainees	20
4	Stool for trainees	20
5.	Cupboard (big)	01
6	White Board (size: 8ft. x 4ft.)	01
7	Trainer's Table	01
8	Trainer's Chair	01