



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

COMPETENCY BASED CURRICULUM

FITTER

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)
NSQF LEVEL- 5



SECTOR – PRODUCTION & MANUFACTURING

FITTER

(Revised in 2017)



CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 5

Skill India

कौशल भारत - कुशल भारत

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

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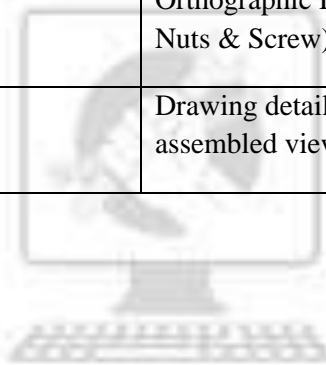
9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

First Semester		Duration: Six Month
Sl. No.	Workshop Calculation and Science	Engineering Drawing
1.	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	Engineering Drawing: Introduction and its importance <ul style="list-style-type: none"> - Relationship to other technical drawing types - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003
2.	Fractions : Fractions, Decimal fraction, L.C.M., H.C.F., Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Scientific Calculator.	Drawing Instruments : their Standard and uses <ul style="list-style-type: none"> - 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.
3.	Square Root : Square and Square Root, method of finding out square roots, Simple problem using calculator.	Lines : <ul style="list-style-type: none"> - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
4.	Ratio & Proportion : Simple calculation on related problems.	Drawing of Geometrical Figures: Definition, nomenclature and practice of <ul style="list-style-type: none"> - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
5.	Percentage : Introduction, Simple calculation. Changing percentage to decimal and fraction and vice-versa.	Lettering and Numbering as per BIS SP46-2003: <ul style="list-style-type: none"> - Single Stroke, Double Stroke, inclined, Upper case and Lower case.
6.	Material Science : properties -Physical & Mechanical, Types –Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron,	Dimensioning: <ul style="list-style-type: none"> - Definition, types and methods of dimensioning (functional, non-functional and auxiliary)

	Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.	<ul style="list-style-type: none"> - Types of arrowhead - Leader Line with text
7.	Mass, Weight and Density : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals.	<p>Free hand drawing of</p> <ul style="list-style-type: none"> - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension - Transferring measurement from the given object to the free hand sketches.
8.	Speed and Velocity : Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation, equations of motions, simple related problems.	<p>Sizes and Layout of Drawing Sheets</p> <ul style="list-style-type: none"> - Basic principle of Sheet Size - Designation of sizes - Selection of sizes - Title Block, its position and content - Borders and Frames (Orientation marks and graduations) - Grid Reference - Item Reference on Drawing Sheet (Item List)
9.	Work, Power and Energy : 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.	<p>Method of presentation of Engineering Drawing</p> <ul style="list-style-type: none"> - Pictorial View - Orthogonal View - Isometric view
10.	-----	<p>Symbolic Representation (as per BIS SP:46-2003) of :</p> <ul style="list-style-type: none"> - Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings

Second Semester		Duration: Six Month
Sl. No.	Workshop Calculation and Science	Engineering Drawing
1.	Algebra : Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Construction of Scales and diagonal scale
2.	Mensuration : Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids – cube, cuboids, cylinder and Sphere. Surface area of solids – cube, cuboids, cylinder and Sphere.	Practice of Lettering and Title Block
3.	Trigonometry : Trigonometrical ratios, measurement of angles. Trigonometric tables	Dimensioning practice: <ul style="list-style-type: none"> - Position of dimensioning (unidirectional, aligned, oblique as per BIS SP:46-2003) - Symbols preceding the value of dimension and dimensional tolerance. - Text of dimension of repeated features, equidistance elements, circumferential objects.
4.	Heat & Temperature : 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.	Construction of Geometrical Drawing Figures: <ul style="list-style-type: none"> - Different Polygons and their values of included angles. Inscribed and Circumscribed polygons. - Conic Sections (Ellipse & Parabola)
5.	Basic Electricity : 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.	Drawing of Solid figures (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.
6.	Levers and Simple Machines : levers and its types. Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine, Relationship between	Free Hand sketch of hand tools and measuring tools used in respective trades.

	Efficiency, velocity ratio and Mechanical Advantage.	
7.		<p>Projections:</p> <ul style="list-style-type: none"> - Concept of axes plane and quadrant. - Orthographic projections - Method of first angle and third angle projections (definition and difference) - Symbol of 1st angle and 3rd angle projection as per IS specification.
8.		Drawing of Orthographic projection from isometric/3D view of blocks
9.		Orthographic Drawing of simple fastener (Rivet, Bolts, Nuts & Screw)
10.		Drawing details of two simple mating blocks and assembled view.



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