

SYLLABUS FOR  
**Module-2 : ENGINEERING TECHNOLOGY (ET)**  
UNDER MODULAR PATTERN OF CRAFT INSTRUCTOR TRAINING

PART I: WORKSHOP CALCULATION & SCIENCE  
PART II: ENGINEERING DRAWING

*FOR THE TRADES OF:*  
FITTER, TURNER, MACHINIST, MACHINIST (GRINDER),  
TOOL & DIE MAKER AND MMTM

Designed in -2009

Government of India  
Ministry of Labour & Employment  
Advanced Training Institute  
Udyog Nagar,  
Kanpur-208022(U.P.)

**LIST OF MEMBERS WHO ATTENDED THE TRADE  
COMMITTEE MEETING FOR THE TRADE OF  
" ENGINEERING TECHNOLOGY"**

**NAME, DESIGNATION & ORGANISATION**

S/Sri

**CHAIRMAN**

**D.MALLIK**

Director, Advanced Training Institute,  
Udyog Nagar, KANPUR

**MEMBER SECRETARY**

**N.S. GARBYAL**

Joint Director, Advanced Training Institute,  
Udyog Nagar, KANPUR.

**MEMBERS**

1. **M.C.SHARMA**  
Joint Director,  
C.S.T.R.I., Kolkatta
2. **G.B. SAXENA**  
Dy. General Manager. (Retd.),  
Ordnance Factory, KANPUR.
3. **H.B. KALRA**  
Faculty Member,  
Department of Mechanical Engineering  
University Institute of Engineering & Technology,  
C.S.J.M. University, KANPUR.
4. **RAJEEV KUMAR BANDIL**  
Dy. Chief Engineer,  
The India Thermit Corporation Ltd.  
Panki Industrial Estate, KANPUR.
5. **JAI NARAYAN**  
Work Shop Superintendent,  
Govt. Polytechnic, KANPUR.
6. **VINOD KUMAR RASTOGI**  
Technical. Assistant,  
Department of Mechanical Engineering  
University Institute of Engineering & Technology  
C.S.J.M. University, KANPUR
7. **GOPAL**  
Foreman,  
Govt. I.T.I.,KANPUR.

8. **NARESH CHANDRA**  
Dy. Director of Training,  
Advanced Training Institute,  
Udyog Nagar, KANPUR.
9. **G.N. ESWARAPPA**  
Dy. Director of Training,  
Advanced Training Institute,  
Udyog Nagar, KANPUR.
10. **H.C.GOYAL**  
Dy. Director of Training,  
Advanced Training Institute,  
Udyog Nagar, KANPUR
11. **P.K.SRIVASTAVA**  
Dy. Director of Training,  
Advanced Training Institute,  
Udyog Nagar, KANPUR
12. **S.BADYOPADHYAY**  
Training Officer  
Advanced Training Institute,  
Udyog Nagar, KANPUR
13. **N.SRIDHAR**  
Training Officer  
Advanced Training Institute,  
Udyog Nagar, KANPUR
14. **SAKET KUMAR**  
Training Officer  
Advanced Training Institute,  
Udyog Nagar, KANPUR
15. **R.N.NIGAM**  
Training Officer  
Advanced Training Institute,  
Udyog Nagar, KANPUR
16. **G.LMEENA**  
Assistant Director of Training,  
Advanced Training Institute,  
Udyog Nagar, KANPUR
17. **DURGALAL**  
Vocational Instructor  
Advanced Training Institute,  
Udyog Nagar, KANPUR

## COURSE STRUCTURE

Component	Allotted Time/ Week	Allotted Time/Quarter
Part-I: Workshop Calculation & Science	Theory: 4Hrs a Day=20 Hours	20 x 12 =240 Hours
Part II: Engineering Drawing	Theory: 4Hrs a Day=20 Hours	20 x 12 =240 Hours
<b>Total</b>	<b>40 Hours</b>	<b>40 x 12 =480 Hours</b>

- NOTE:**
1. Week no. 13 will be used for revision and Final Trade Test.
  2. Five minutes per day will be allotted to each trainee for development of communication skill.
  3. Use of scientific calculator is permitted in the examinations.

**ENGINEERING TECHNOLOGY (ET)**  
**UNDER MODULAR PATTERN OF CRAFT INSTRUCTOR TRAINING**  
**PART I: WORKSHOP CALCULATION & SCIENCE**

FOR THE TRADES OF: FITTER, TURNER, MACHINIST, MACHINIST (GRINDER), TOOL & DIE MAKER AND MMTM

**DURATION: 3 MONTHS**

Sl.No.	Week No.	Lesson	Topic	Remarks
1.	01	1. Unit & Measurement	1. Introduction 2. Conversion (Heat, Temperature, Speed, Distance) 3. Different System (CGS, FPS, MKS & SI) 4. Concept of Numbers, Different Numbering System.	
2.	02	2. Basic Algebra  3. Arithmetic	1. Simple Equations 2. Quadratic Equations  1. Common Fraction, Decimal Fraction, Power & Root 2. Ratio & Proportion 3. Simplification 4. Percentage	
3.	03	4. Trigonometry	1. Proof of Basic Theorems (Sine, Cosine, Tan etc) 2. Sine Rule, Cosine Rule & Tan Rule 3. Height and Distance 4. Trigonometry of Half & Double Angle	
4.	04	5. Mensuration  6. Logarithm	2. Area & Volume of different geometrical shapes  1. Use of scientific calculator 2. Log And Antilog Table 3. Solving of problems. <b>REVISION &amp; INTERNAL ASSESMENT</b>	
5	05	7. Newton's Law of Motion  8. Laws of Indices	1. Inertia, Rest and Motion, Velocity and Acceleration. 2. Center of Gravity 3. Related Problems  1. Basic Laws & application	
6	06	9. Cutting speed, Feed, Depth of Cut & Machining Time.	1. Definitions & calculation of Cutting speed, Feed, Depth of Cut & Machining Time for drilling, turning, milling, Shaping & boring.	
7	07	10. Introduction to Threads & Gears.	1. Elements, Types, Calculation of Pitch & Module etc.	

		11. Density & Specific gravity	1. Definition & applications 2. Related Problems.	
8	08	12. Simple Machine  13. Drives	1. Types, Definition & Calculation of Velocity Ratio, Mechanical Advantages & Efficiency.  1. Rope, Belt & Gear Drive <b>REVISION &amp; INTERNAL ASSESMENT</b>	
9	09	14. Work, power & energy  15. Forces	1. Definitions, Units and Applications.  1. Scalar & Vector Quantities 2. Laws of coplanar forces & Applications.	
10.	10	16. Introduction to Engineering Materials & Properties	1. Definitions & uses of Ferrous, Non Ferrous Metals & Alloys. 2. Appearance, Color, Weight, structure, Conductivity, Specific Gravity and Magnetic Properties. 3. Mechanical Properties.	
11	11	17. Strength of Material  18. Heat, Temperature & Heat Transfer  19. Calculation of Blank Sizes	1. Hooke's Law, Definition of Stress & Strain. 2. Type of Loads with different Position of Fulcrum. 1. Definition of Heat & Temperature. 2. Conduction, Convection and Radiation 3. Related Calculations. 1. Length & weight of bent strips, bar stocks, castings etc.	
12	12	20. Friction	1. Laws of Friction 2. Limiting Friction, Inclined Plane 3. Applications. <b>REVISION &amp; INTERNAL ASSESMENT</b>	
13.	13	<b>FINAL TRADE TEST</b>		

**ENGINEERING TECHNOLOGY (ET)**  
**UNDER MODULAR PATTERN OF CRAFT INSTRUCTOR TRAINING**  
**PART-II : ENGINEERING DRAWING**  
**FOR THE TRADES OF FITTER, TURNER, MACHINIST, MACHINIST**  
**(GRINDER), TOOL & DIE MAKER, & MMTM**

Week no.	Topics
1	<p>Introduction to Engineering Drawing and its importance.</p> <p>Simple conventional symbols for different materials and parts as per BIS: 696.</p> <p>Use of drawing instruments in construction of geometrical drawing i.e. polygons, ellipse, parabola, hyperbola, involutes, oval, helix, etc.</p> <p>Free hand sketching of simple geometrical solids, Standard printing style for letters and numbers as per BIS: 696.</p> <p>Construction of plain &amp; diagonal scales, representative fraction etc.</p>
2	<p>Engineering lines, dimension techniques, size and location dimensions of parts, holes, angles, tapers, screws etc. as per BIS: 696.</p> <p>Projection of points –Points in different quadrants. Projection of straight lines – Lines inclined to single plane, lines inclined to both the planes and traces of lines. Projection of planes –Planes inclined to single plane, planes inclined to both the planes and traces of planes.</p>
3	<p>Orthographic projection, first angle and third angle methods of orthographic projection and application of both first angle and third angle methods. Combination of two methods. Methods of representing the drawings of simple &amp; complex machine parts.</p> <p>Orthographic projection of simple geometrical solids.</p>
4	<p>Practice or exercises on orthographic projection in first angle as well as in third angle methods.</p> <p><b>REVISION &amp; INTERNAL ASSESMENT</b></p>
5	<p>Brief discussion on isometric, oblique and perspective projection.</p> <p>Isometric &amp; oblique drawing of simple geometrical solids.</p> <p>Isometric drawing of simple mechanical &amp; casting blocks.</p> <p>Conversion of isometric drawings to orthographic drawings &amp; vice versa.</p>

6	<p>Standard methods of sectioning as per BIS: 696 such as full section, half section, off set section, removed section, revolved section and partial or broken section etc.</p> <p>Sectional views such as sectional front view, sectional top view and sectional side view etc.</p> <p>Exercises on different sectional views on the given orthographic and isometric drawing of machine parts, castings etc.</p>
7	<p>Development of lateral surfaces of simple geometrical solids like cubes, Rectangular blocks, cones, pyramids, cylinders, prisms, frustums etc.</p> <p>Screw threads and their standard forms as per BIS: 696 External and internal threads, conventions on the features for drawing as per BIS: 696.</p>
8	<p>Sketches for bolts, nuts, screws and other screwed members of locking devices for screw threads, shaft couplings using bolts, nuts, keys etc.</p> <p>Standard welding symbols as per BIS: 696 and their applications on drawing of welded fabrications.</p> <p>Standard rivet forms as per BIS: 696 and different riveted joints.</p> <p><b>REVISION &amp; INTERNAL ASSESMENT</b></p>
9	<p>Sketches of keys, cotters and pin joints between shaft and sleeves.</p> <p>Sketches for simple pipes &amp; unions with simple pipe line drawings.</p> <p>Concept of preparation of assembly and detailed drawing.</p> <p>Simple assemblies &amp; their details of trade related tools/job/exercises from the given samples or models.</p>
10	<p>Assembly and detail drawing of trade related machine tools i.e. clapper box, tail stock, bench vice, simple drill Jig etc.</p> <p>Practice on assembly drawing of shaft and pulleys.</p> <p>Practice on assembly of bush bearing.</p> <p>Practice on assembly of simple coupling.</p> <p>Details of assembly of a simple hand vice, simple drilling Jig etc.</p>
11	<p>Advance blue print reading related to limits, fits, sizes, tolerances, machining symbols and reading out of detailed drawing from an assembly.</p>
12	<p>Introduction and practical exercises on AUTOCAD</p> <p><b>REVISION &amp; INTERNAL ASSESMENT</b></p>
13	<p><b>FINAL TRADE TEST</b></p>

## TOOLS & FURNITURES LIST FOR ENGINEERING TECHNOLOGY

### **UNDER MODULAR PATTERN OF CRAFT INSTRUCTOR TRAINING PART-II : ENGINEERING DRAWING FOR THE TRADE OF FITTER, TURNER, MACHINIST, MACHINIST (GRINDER), TOOL & DIE MAKER, & MMTM**

1. Well settled and furnished classroom for the capacity of 60 nos of trainees with the following items ...
  - ( a ) Drawing desk table as per the numbers of trainees.
  - ( b ) Stool or chairs as per the numbers of trainees.
  - ( c ) One number of office table for Training officer.
  - ( d ) One number of office chair for Training officer.
  - ( e ) Computers with necessary accessories – 05 nos.
  - ( f ) Computers tables & Chairs – 05 nos each.
  - ( g ) Software for Auto-Cad. – 01nos
  - ( h ) Printer small size – 01 nos.
  - ( l ) Printer big size for printing of big size drawing – 01.nos.
  - ( j ) Over Head slide projector – 01 nos.
  - ( k ) White Board ( folding ) for display of study materials through OHP – 01 nos.
  - ( l ) Drawing Boards as per the numbers of trainees.
  - ( m ) T – Squares as per the numbers of trainees.
  - ( n ) Set – Squares sets and French curves sets as per the numbers of trainees.
  - ( o ) Mini – Drafters as per the numbers of trainees.
  - ( p ) Cup board for keeping of Drawing Boards, T – Squares, Set – Squares sets, French curves sets and Mini – Drafters – 02 nos.
  - ( r ) Geometrical box for Engineering Drawing – 02 nos.
  - ( s ) Models and charts for Engineering Drawing as per requirements.
  - ( t ) Cup board for keeping of Models and charts – 02 nos.
  
2. Well furnished Chamber / Room for faculty members with the following items ...
  - ( i ) office tables – 02 nos.
  - ( ii ) office chairs – 02 nos.
  - ( iii ) Visitors Chairs – 06 nos.
  - ( iv ) Almirah small size – 02 nos.
  - ( v ) Almirah big size – 02 nos.