

SYLLABUS FOR
FITTER CUM BLACKSMITH



UNDER CODE OF REGULATIONS FOR
INDUSTRIAL SCHOOLS

AS APPROVED BY
DEPARTMENT OF EMPLOYMENT AND
TRAINING, CHEPAUK,
CHENNAI - 600 005.

.....2005

COURSE DETAILS

Name of Trade	FITTER CUM BLACKSMITHY
Qualification	: 10TH PASS / FAIL
Age	: 14-40 Years
Duration	: 3Years
Number of Trainees	: 20
Number of Practical hours	: 32 hrs. per week
Number of Theory Hours	: 8 hrs. per week
Number of Workshop Calculation hours	: 2 hrs. per week.
Number of Engineering Drawing hours	: 2 hrs. per week
Space Required	
Workshop	: 800sq. feet
ClassRoom	: 200 sq. feet
Power Required in KW	: 5 k.w.

LIST OF COMMITTEE MEMBERS FOR THE TRADE OF FITTER CUM BLACKSMITH



MEMBERS AND EXPERTS

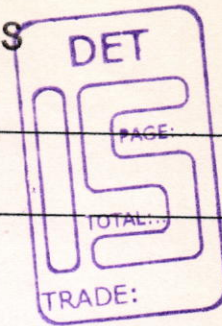
1. Thiru. S.SUBBIAH M.E.,
RJD COIMBATORE REGIN.

2. Thiru. R.MAHESWARAN B.E.,
PRINCIPAL, GOVT. ITI, TIRUPPUR.

3. Thiru. R.SHANMUGA SUNDARAM B.E.,
JTO (AT), GOVT. ITI, COIMBATORE.

4. Thiru. R.KRISHNA MURTHY B.E.,
JTO (MATHS) , GOVT. ITI, COIMBATORE.

FITTER PRACTICALS



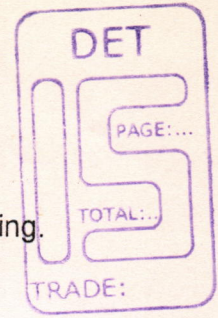
Week No :

Syllabus

FIRST YEAR

1. Safety precautions in shop floor-layout of fitting shop-Introduction to machinery used in trade-Types of work done by Trainees-Types of jobs made by the trainees-Study of simple drawings.
2. Introduction to study equipment and their uses.
3. Gripping the job in vice Jaws-Proper fitment of blade in the Hacksaw frame.
4. Marking & Punching practice.
5. Hack sawing to given dimension-Sawing different types of metals.
6. Drawing and study of layout of Fitting shop and Workshop.
7. Filing Practice.
8. Filing channel-Parallel filing-Filing Flat & square.
9. Simple open Fitting.
10. Marking of straight and parallel lines-With the use of odd leg caliper-Steel rule-Divider.
11. Marking according to simple blue prints
12. Marking of arcs and profiles using scribing block and dividers-Chipping Flat surfaces along a marked line.
13. Revision.
14. Test and Maintenance.

ACHIEVEMENT: The trainee should be able to.



- a. Use Fitter Hand Tools.
- b. Study the simple drawing and do the marking.
- c. Do hack sawing, Chipping and filing.

- 15. Marking Punching of profiles.
- 16. Filing - square, Rectangular, parallel - use of Try Square.
- 17. Chipping - Key way , Oil grooves, slots
- 18. Sawing practice -straight and angular of thin and thick sections.
- 19. File steps and finish 0.25mm.
- 20. Filing and chamfering practice.
- 21. File radius and profile to suit gauge.
- 22. File steps and finish with smooth file accuracy ± 0.25 mm & measuring.
- 23. Make simple open and sliding fit.
- 24. Punch letter and number.
- 25. Revision.
- 26. Test and Maintenance.

ACHIVEMENT: The Trainee should be able to

- a. Use different types of files.
- b. Make simple open and sliding fit.
- 27. Drill blind hole -straight and at an angle.
- 28. Counter sink, counter bore practice.
- 29. -do-

30. Scrap angular mating surface and internal surface
31. Stepped filing and measuring.
32. Radius filing and chamfering practice.
33. Make 'v' grooves and slots on cast iron blocks.
34. Sliding fitting assembly with parallel and angular mating surfaces, Accuracy ± 0.04 .
35. File and fit combined radius and angular surface, Accuracy ± 0.04 .
36. Triangular and Hexagon fitting ± 0.02 mm.
37. Open step and split fit (Three piece Fitting)
38. Making a snap gauge ± 0.02 mm.
39. Revision.
40. Test and Maintenance.

ACHIEVEMENT: The trainee should be able to

- a. Drill holes and do counter sink.
 - b. File parallel, curve, groove and split fit fitting.
 - c. Use vernier, Height vernier and Micrometers.
41. Reaming through holes.
42. Drilling P.C.D Holes.
43. Reaming P.C.D Holes.
44. Form internal threads with taps to std size.
45. -do-
46. Drilling & Counter Boring.
47. -do-



- B
48. Form external threads with dies to standard size.
 49. Drilling and tapping in shaft.
 50. Contour filing.
 51. Making simple Drill-jig.
 52. Final Test.



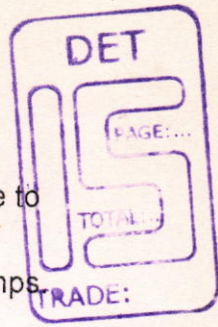
ACHIEVEMENT: The trainee should be able to

- a. Drill and ream holes.
- b. Do tapping, Dieing, Counter boring.
- c. File to an accuracy of ± 0.05 mm for sliding Fit and ± 10 minutes for an angular fitting.

SECOND YEAR

53. Making outside Caliper
54. Making 'V' Block.
55. Making a Try Square
56. Making key-gib headed key- woodruff key.
57. Making Parallel Clamp
58. -do-
59. Making Spanner.
60. -do-
61. Assembly and dove tail fitting.
62. -do-
63. Dismantle and assembly of simple machine tool.
64. -do-

- 65. Revision.
- 66. Test and Maintenance

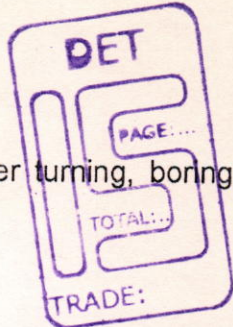


ACHIEVEMENT: The trainee should be able to

- a. Make Try Square, inside caliper and Clamps.
 - b. File key slots and Splined keys.
 - c. Make simple assemblies.
 - d. Dismantle and assembly of simple machine tools.
- 67. Riveting practice-Using various types of rivets.
 - 68. Make Rivetted Joints, Lap and Butt Joint.
 - 69. -do-
 - 70. Introduction to lathe -Centering practice-Layout of machine shop-Safety precautions to be followed in machine shop.
 - 71. Plain taper turning, Radius Forming and checking.
 - 72. Facing, Centering, Turning, Chamfering. Boring practice.
 - 73. Turning, Threading practice.
 - 74. Plain and stepped turning, simple taper turning and knurling.
 - 75. Plain and stepped internal and external turning, Boring and checking.
 - 76. -do-
 - 77. Stepped turning, Drilling, Threading and knurling.
 - 78. -do-
 - 79. Revision.
 - 80. Test and Maintenance

ACHIEVEMENT: The trainee should be able to

- a. Do riveting.
- b. Do chucking, centering, plain turning, Tapper turning, boring and thread cutting.



SHEET METAL WORK

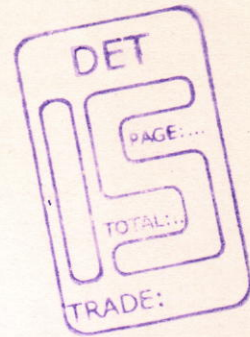
- 81. Introduction to sheet metal shop-sheet metal tools and its uses-safety precautions to be followed in sheet metal shop.
- 82. Various sheet metal joints practice.
- 83. Practice of soldering with soldering Iron and stick.
- 84. Make simple square container.
- 85. Making square tray with square soldered corner.
- 86. Making cone.

WELDING

- 87. Introduction to welding shop-types of welding-tools and accessories-operation safety rules to be followed. Stricking and maintain arc straight-line head.
- 88. Make square Butt joint.
- 89. Make 'T' fillet joint gas and ARC.
- 90. Make Lap joint.
- 91. Do gas cutting.
- 92. Single 'V' Butt joints outside corner joint.
- 93. Revision.
- 94. Test and Maintenance

ACHIEVEMENT: The trainee should be able to

- a. Make square tray with solder corner.
 - b. Do gas cutting.
 - c. Do various ARC welded joints.
95. Vernier caliper-outside Micrometer-Height vernier calibration with standard Test Pieces and Rings.
96. -Do-
97. Introduction to M.S office-creating and opening a file.
- 98 to 102. Industrial visit & in plant Training.
103. Revision.
104. Final Test.



ACHIEVEMENTS: The trainee should be able to

- a. Dismantle and assemble simple machine parts & accessories.
- b. Make simple jigs & Fixture.

THIRD YEAR: BLACK SMITH

105. Introduction to smithy shops-operations-Tools & equipment used preparing Forge-lighting the fire.
106. Marking & Heating, Bending, Tapering and checking.
107. Bending of hot bars.
108. Drawing down of thicker sections shoulder formation.
109. Bending of round bar.
110. Bending of square bar.
111. Forge square rod from round stock.

112. Forge M.S Bar Square to octagon.
113. Forge M.S Bar Square to hexagon.
114. Heat treatment practice-Normalizing.
115. Heat treatment practice-Hardening.
116. Heat treatment practice-Tempering.
117. Revision.
118. Test and Maintenance



ACHIEVEMENT: The trainee should be able to

- a. Prepare and fire the forge.
 - b. Use Black smithy tools.
 - c. Forge square, round, hexagon, octagon.
119. Heat treatment practice-case-Hardening.
 120. Measurement of hardness testing by poldi hardness tester.
 121. Forge a bolt.
 122. Forge a flat chisel and do the heat treatment.
 123. Forge a Screw Driver and do the heat treatment.
 124. Forge a flat drill and do the heat treatment.
 125. Forging a chain.
 126. Forging a round nose chisel and do the heat treatment.
 127. Forging a parting tool.
 128. Forging a 'V' tool.
 129. Forging an offset facing tool.

130. Revision & Test.

ACHIEVEMNT: The trainee should be able to

- a. Do Heat treatment.
- b. Forge chisel, Screw Driver, Facing and Boring Tool.

131. Forging a Boring Tool.

132. Forging of an Eyebolt.

133. Forging of Firmer chisel.

134. Forging of Mortise chisel.

135. Jumping practice.

136. Upsetting practice.

137. Swaging practice.

138. Fullering practice.

139. Drawing out practice.

140. Forging of Spanners.

141. -Do-

142. Forging of Tongs.

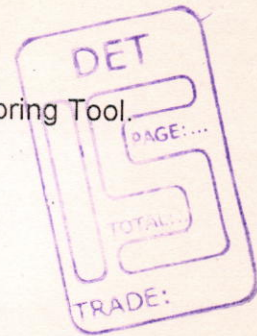
143. -Do-

ACHIEVEMNTS: The trainee should be able to

- a. Do Drawing, Jumping, Upsetting,
- b. Forge eyebolt, Chain, Spanners.

144. Making of H.S.S tools tips and brazing in the forge.

145. -Do-



- 146. Making punch and do the Heat Treatment.
- 147. Forging a "T" slot tool and do the Heat Treatment.
- 148. Forging of guide Pin-Lever.
- 149&150. In plant Training & Industrial Visit.
- 151 to156 Revision & Final Test.



ACHIEVEMENTS:

The trainee should be able to

- a. Forge simple components and Tools.
- b. Do Heat Treatment.

FITTER CUM BLACKSMITH THEORY

Week wise Theory Syllabus

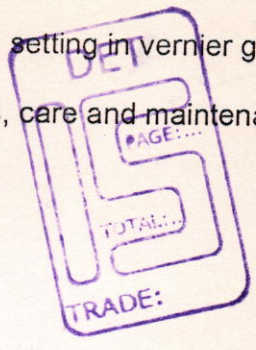


Week No :	Syllabus
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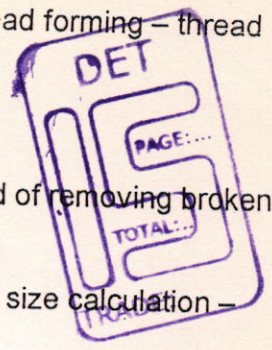
FIRST YEAR

1. Introduction to the Trade – Importance of the trade in the industry.
2. Safety – Types of Safety – workshop safety, Hand tools Safety, Machine Safety and Personal Safety – Rules regarding Safety.
3. Handling of safety equipments & uses.
4. Accidents – causes for accidents – Types of accidents – effect of accidents – First aid
5. Accidents prevention – Machine , Men & Industry.
6. Industrial System – Layout of an Industry – importance of proper layout
7. Advantages of good layout.
8. Introduction to fitter – Types of fitters and their application
9. Types of instruments and their classification
10. Measuring Tools – Classification – Non-Precision tools – types, uses and care & maintenance of steel rule – calipers – bevel protractor
11. Handling and method of using Non-precision tools
12. -- do --
13. Revision
14. Test and Maintenance
15. Precision Measuring instruments – Types – uses, care and maintenance of vernier calipers, micrometers
16. Least count calculation & zero error settings
17. Micrometers – uses – application - types
18. Measurement method – Digital Instruments
19. Marking Tools – Marking media, marking table, surface plate, v-blocks
20. Angle plates – Grades and application
21. Try square, height gauge, scribes, punches

- 22. Checking the trueness of Try square – Fine setting in vernier gauge.
- 23. Work holding devices – vices – Types, uses, care and maintenance – Parallel block, c-clamp, parallel clamp
- 24. Construction & Handling of vices & clamps.
- 25. Revision
- 26. Test and Maintenance
- 27. Cutting Tools – Types – Files, Chisels, Hacksaw, drills, reamers, Taps and dies, scrapers.
- 28. Scrapers – Application of scrapping – methods of scrapping.
- 29. Files – Types and grades – construction – application – Filing methods – care and maintenance.
- 30. Hacksaw frames – Types – Hacksaw blades – specification – saw set – Types
- 31. Hack sawing method – selection of blades
- 32. Chisels – Types – uses – material for making chisels – grinding of chisels – safety precautions – application of chisels
- 33. Hammers – Types – Specifications – material – uses of various types of hammers – safety precautions.
- 34. Drills – Nomenclature of a drill – Types of drill – material of drill – metric and inch drills – drill angles – Drill holding devices – sleeves and sockets – defects – during drilling – causes and remedies - Regrinding of drills.
- 35. Sizes of drills – Metric & Inch Drills
- 36. Tap & Drill size calculations
- 37. Drilling machines – Types – construction – Specification – application and uses
- 38. Cutting speed – Feed – R.P.M. calculation for various metals.
- 39. Revision
- 40. Test and Maintenance



41. Threads – Types of threads – thread cutting and thread forming – thread calculations – External and Internal thread cutting
42. Threads specification & uses - Applications
43. Taps – Types – using method – Tap wrench – method of removing broken tap – drill size calculation
44. Reamers – types – hand and machine reamers – drill size calculation – grinding of reamers
45. Grinding – types of grinding machines – dressing of grinding wheels
46. Grinding wheels specification & Marking system.
47. Assembly techniques – Dowelling pinning – peening – riveting – staking
48. Method and advantages
49. Brazing – Hard soldering - tools required and its applications
50. Types of fluxes & uses.
51. Revision
52. Test and Maintenance



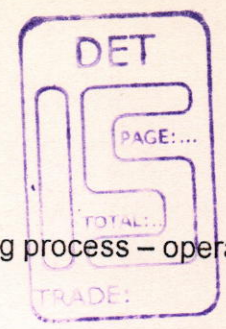
SECOND YEAR

53. Machining process – introduction – conventional and non – conventional machines and machining – shaper, planer, slotter and milling machines – description and applications.
54. Operations performed in various machines
55. Machine constructions & specifications
56. special machining process – honing-jig boring-broaching-gearhobbing.
57. special machines - Uses & Application
58. Maintenance and mill Wright – introduction – objectives of maintenance – Types of maintenance – Types of records in maintenance.
59. Maintenance of lathe – Shaper – Drilling machine – Grinding machine – Milling machine.
60. Erection & Testing of machines.
61. Machine lubrication.

62. Pipes and pipe fittings – method of fitting – use of pipe bending tools
Repair and erection.
63. Plumbing – Pipe Fitting symbols – Description.
64. Types of valves – construction & uses.
65. Revision
66. Test and Maintenance.
67. Jigs and fixtures – Introduction – types -- uses.
68. Jig and fixtures -Constructions & Features.
69. - do -.
70. Fasteners – types – uses and applications
71. Fasteners – Constructions & Features.
72. Designation – Specification.
73. Limits and fits – Introduction – types of fits – Interchangeability – tolerance
– application of fits and tolerance
74. Indian Std. System – BIS System.
75. Tolerance chart – Holes & Shaft basis system.
76. Introduction to Lathe
77. Turning process – introduction – lathe construction – parts – types of
operations involved in lathe – tools used – tool angles
78. Lathe – Work supporting devices – Faceplates – Driving plates – Carriers
– Types & uses.
79. Revision
80. Test and Maintenance
81. Sheet metal works – introduction- sheet specifications – types of sheets-
tools used in sheet metal shops.
82. Various allowances – Development Drawings.
83. Types of layouts – types of joints and its applications – soldering –
soldering iron – flux and its application
84. Soldering Temperature – Composition of Soldering.



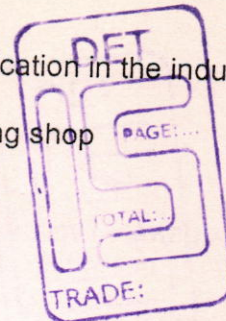
- 85. soldering joints-Advantages – Limitations.
- 86. - do -
- 87. Welding – Introduction
- 88. Types of welding equipments – gas and Arc welding process – operations – types of joints and its applications.
- 89. Selection of Filler rods – Gas pressure – Nozzles in gas welding.
- 90. Welding current selection – Defects in welding – causes & remedies.
- 91. Testing of welded joints.
- 92. Welding symbols – Description.
- 93. Revision
- 94. Test and Maintenance
- 95. Calibration of measuring tools – Introduction – requirement – necessity of calibration
- 96. Various calibration method – Charts – Acceptable limits.
- 97. -- do --
- 98. Computer – Introduction – Role of computer in industry.
- 99. CNC and NC machines – introduction – importance of CNC machines in modern industry
- 100. Requirement of system in an Industry – Introduction to I.S.O. – necessity of I.S.O. and other system.
- 101. Industrial Visit and inplant training Industrial visit.
- 102. -- do --
- 103. Revision
- 104. Test and Maintenance



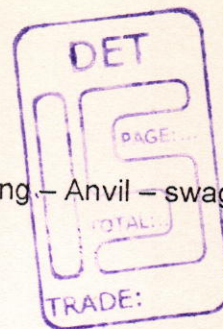
THIRD YEAR - BLACK SMITHY THEORY

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105. Introduction to the Trade – Importance and application in the industry
106. Safety Precautions – Safety work habits in forging shop
107. Causes of accidents – Prevention of accidents
108. -- do --
109. Metal ferrous and non-ferrous –properties and uses. Material physical & Mechanical properties effect on heat on metals.
110. Pig iron – Cast iron – Steel Manufacturing process.
111. Black smithy introduction – Forging materials – Heating devices – forging temperature and colour.
112. Forging temp for Mild steel – High carbon steel – High speed steel.
113. Forgeable material and its specification.
114. Various heat treatment process – objectives process and uses – stages in Heat treatment
115. Heat treatment temp for ferrous metal – Steels – High speed steel – Non-ferrous metals.
116. Heat treatment temp for non-ferrous metals.
117. Revision
118. Test and Maintenance
119. Various heat treatment furnace control of temp in furnace
120. Muffle furnace & Salt bath furnace – Construction process - Advantages and limitations
121. .- do -
122. Surface hardening process – case hardening – carburising – Nitriding – Flame hardening – Induction hardening and their uses - Advantages and limitations.
123. - do -
124. - do -
125. Method of heating & cooling.
126. Forge and its accessories – Function forge tools and its applications
127. Safety handling method of forge tools.

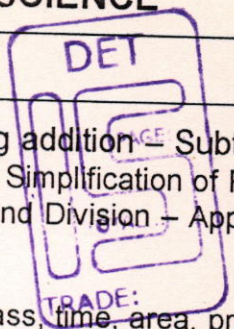


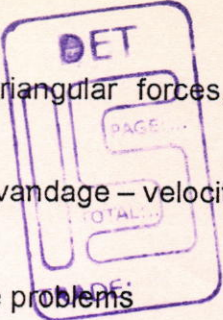
128. Forge construction & Working method.
129. Revision
130. Test and Maintenance
131. Cutting tools for forging – uses- method of using – Anvil – swage block – Hammers – Tongs – Punch – drift.
132. Cutting angles & handling methods.
133. -- do –
134. Operations performed in forging shop upsetting – Drawing – Twisting Bending – defects and remedies.
135. - do -
136. Punching – Drifting – operations and method - defects and remedies.
137. - do -
138. Hand and power forging – power hammers Grain flow effects of forging – Applications – Types.
139. Smith die forging – Impression die forging – Classifications.
140. -- do –
141. Defects in forging – Determination of duration of heating time
142. Defects solving methods.
143. Heat treatment of forged parts.
144. Allowances for forging – wastage – M/c etc., Advantages of hot & cold working of metals
145. Draft angles – Fillets and corners, shrink factor, cavities – Tolerances.
146. Design considerations – Advantages and limitations.
147. Preparing of die for Production – Die setting - M/c Setting – Inspection Of product – procedures.
148. Forging die materials - Die life.
149. Dies constructions.
150. -- do –
- 151 to 156. Revision and Final.



WORKSHOP CALCULATIONS & SCIENCE

MONTH No.	SYLLABUS
Month 1	: Introduction – Simple calculations involving addition – Subtraction – Multiplication & Division – Simple fraction – Simplification of Fraction using addition – Subtraction – Multiplication and Division – Application of Fractions in shop problem.
Month 2	: Units and measurements – Unit of Length, Mass, time, area, pressure, density and Volume – Conversion of Units – S.I. Units.
Month 3	: Decimal Fraction – Conversion of Common Fraction to decimal Fraction and Vice – Versa – Addition, Subtraction, Multiplication and Division.
Month 4	: Square root – Factorization method and Division method – Square root of whole number and decimal.
Month 5	: Speed, Velocity, Acceleration and Retardation, Equations of motion, Newton laws of motion – Force – Definition and its Units – Mass and Weight.
Month 6	: Work, Power, energy – Definition and Units – Simple problems.
Month 7	: Horse power – Efficiency-I.H.P. B.H.P. Definitions- Simple problems.
Month 8	: Percentage – Conversion of percentage into decimal and Simple Fractions – Application in Shop Problems.
Month 9	: Ratio and proportion – Shop problems involving ratio – proportion – Direct and Inverse Proportion.
Month 10	: Friction – Types of Friction – co-efficient of friction – Advantages and disadvantages. Method to reduce friction, Laws of friction.
Month 11	: Algebra – addition, subtraction, Multiplication and Division.
Month 12	: Standard Algebraic formulae – Simplification of expression using formulae.
Month 13	: - do -
Month 14	: Revision and Test
Month 15	: Factorization – Simple problems of Algebra.
Month 16	: Algebra Simple equation – problem solving using Simple equations
Month 17	: Simultaneous equations – solving shop problems.

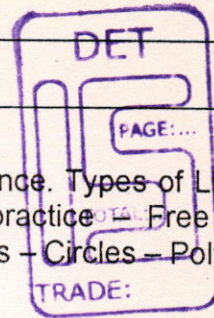


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- Month 18 : Statics – Law of parallelogram, law of triangular forces, Lami's Theorem.
- Month 19 : Simple machines – Definition – Mechanical advantage – velocity ratio – Mechanical efficiency – Simple problems.
- Month 20 : Lever – Types of Lever – Screw Jack – Simple problems
- Month 21 : Logarithm – Use of logarithm tables – Multiplication and Division – Using logarithm.
- Month 22 : - do -
- Month 23 : Power and Root Calculations using logarithm.
- Month 24 : Revision and Test
- Month 25 : Mensuration – Calculation of area & perimeter of square, rectangle, circle, triangle, Parallelogram, trapezium, Area of a sector and segment.
- Month 26 : - do -
- Month 27 : Heat – Definition and Unit – effect of Heat – Difference between heat – Difference between heat and temperature – conversion of centigrade to Fahrenheit and vice-versa.
- Month 28 : Pyrometer – Types and uses – Working of Thermo-electric and Optical Pyrometer - Calorimeter – Heat loss and gain - simple problems.
- Month 29 : Cylinder, Hollow cylinder – calculation of Volume and weight Volume and weight – Cube, Cuboid, Prism – simple problems.
- Month 30 : Cone – Frustrum of Cone – Pyramid Volume and Weight Calculations.
- Month 31 : Stress & Strain – Definition and simple problems – Factor of safety – Elastic limit – Hooke's Law – Young's Modulus – Simple Shop problems - Cutting Speed, Feed, Depth of cut Definitions – Simple problems.
- Month 32 : Electricity – Definitions – Volt, Ampere, Ohm – Ohm's law – Simple problems – Series and Parallel connection – Calculation of resistances.
- Month 33 : Trigonometric ratios – conversion from degree to radian and vice-versa – Calculation of height and distance using trigonometrical ratios.
- Month 34 : Trigonometrical formulae – Proving an equation using the formulae.
- Month 35 : Revision
- Month 36 : Test

ENGINEERING DRAWING

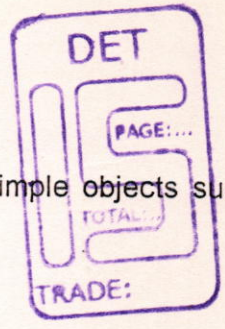
MONTH No.

SYLLABUS



- Month 1 : Introduction to trade – Engg.Drg. and its importance. Types of Lines – Their meanings and applications – Lettering practice – Free hand sketching of Straight Lines – rectangles – Squares – Circles – Polygons etc. – Blue Print readings.
- Month 2 : - do -
- Month 3 : Simple conventional symbols formatting and parts as per I.S. Specification – Use of drawing instruments – Construction of Geometrical drawings – angles – Triangles etc.
- Month 4 : - do -
- Month 5 : Geometrical construction of polygons ellipse – parabola – Hyperbola – Square Polygon, square Solids – Cube, Cone, Prism, Cylinder, Sphere, Pyramids
- Month 6 : - do -
- Month 7 : Simple Dimensioning Technique – size and location Dimension of parts, holes angles – Taper Screw etc as per I.S. specification.
- Month 8 : Free hand Sketching of nuts – bolts – Rivets – Washers – Keys and Screws – Threads with dimensions from samples.
- Month 9 : - do -
- Month 10 : Pictorial drawings – isometric drawings of simple geometrical solids
- Month 11 : - do -
- Month 12 : - do -
- Month 13 : - do -
- Month 14 : Revision & Test
- Month 15 : Oblique projection of simple geometrical Solids
- Month 16 : - do -

- Month 17 : Views of simple hollow and solid bodies with dimensions – use of different types of lines and symbols for drawing.
- Month 18 : - do -
- Month 19 : - do -
- Month 20 : Simple isometric drawing – Isometric view of simple objects such as square, rectangles, cubes, rectangular, blocks.
- Month 21 : - do -
- Month 22 : - do -
- Month 23 : Isometric drawing of simple machined & casting blocks.
- Month 24 : - do -
- Month 25 : - do -
- Month 26 : Plan, elevation of simple objects – Hexagonal bar, square bar, Hollow bar.
- Month 27 : - do -
- Month 28 : Orthographic Drawings, applications of both First and Third angle – Method of representing the drawings for simple and complex machine blocks.
- Month 29 : - do -
- Month 30 : Isometric Views of Simple Objects
- Month 31 : - do -
- Month 32 : Free hand Sketch of simple assembly drawings
- Month 33 : - do -
- Month 34 : - do -
- Month 35 : Revision – Industrial Visit
- Month 36 : Final Test



INDUSTRIAL SCHOOLS**TRADE SYLLABUS – REVISED**

Name of the Trade : **FITTER CUM BLACKSMITH**

SPACE REQUIRED

(1) Workshop/Lab : 800 sq. ft.

(2) Class Room : 200 sq. ft.

Trade Practical : No change

Trade Theory

WEEK No.	THEORY REVISED
53	Planner, slotter – cancelled
56	Special machining process-honing - jig – boring – broaching – gear hobbing - cancelled
57	Special machines – Uses & application – cancelled
58	Maintenance and millwright – introduction – objectives of maintenance – type of maintenance – types of records in maintenance – cancelled
59	Maintenance of Lathe, shaper ,Drilling Machine , Grinding Machines, Milling machines – Milling Machine- cancelled
60	Erection and testing machines – cancelled
74	Indian Std. System – BIS System – cancelled
96 & 97	Various calibration methods charts acceptable limits - cancelled
99	CNC and NC machines introduction, importance of CNC machines in modern industry – cancelled
100	Requirement of system in an industry introduction to ISO necessity of ISO and other system - cancelled

Workshop Calculation

Month No.	Workshop calculation
11	Algebra, addition, subtraction, multiplication and division – cancelled
12	Standard algebraic formula, simplification of expression using formula – cancelled
21&22	Logarithm – use of logarithm tables, multiplication and division using logarithm – cancelled
23	Power and root calculation using logarithm-cancelled
25	Menstruation calculation of area and perimeter, Area of sector, Segment-Cancelled
28	Pyrometer – types and uses - working of thermo- electric and optical pyrometer , calorimeter, heat loss and gain, simple problem – cancelled

31	Stress and strain-definition and simple problem-factor of safety-elastic limit – hooke’s law-young’s modulus-simple shop problems-cutting speed, feed ,depth of cutting definition-simple problem – cancelled
32	Simple problem series and parallel connection – calculation of resistance –problem – cancelled
33	Trigonometric ratios – conversion from degree to radian and vice versa-calculation of height , distance using trigonometrically ratios – cancelled
34	Trigonometrically formula – proving an equation using formulae – cancelled

ENGINEERING DRAWING

Month no.	Engineering drawing
15&16	Oblique projection of simple geometrical solids-cancelled
23-25	Isometric drawing of simple machine and casting block-cancelled
28&29	Orthographic drawings- application of first and third angle method of drawing of simple, complex machine blocks – cancelled
30&31	Isometric views of simple projects – cancelled

List Of Tools & Equipments
For The Trade Of FITTING CUM BLACKSMITH

FOR A BATCH OF 20 TRAINEES

TOOL KIT

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
1	Rule steel 15cm with metric graduations	10
2	Square try 10cm blade	10
3	Caliper outside 15cm spring	5
4	Caliper inside 15cm spring	5
5	Divider 15 cm spring	5
6	Scriber 15cm	10
7	Punch Centre 10cm	5
8	Screw driver 15 cm	5
9	Chisel cold 10 cm	5
10	Hammer ball pein 0.45Kg with handle	5
11	Hammer ball pein 0.22 kg with handle	5
12	File Flat 25cm second cut	5

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
13	File Flat 25cm smooth	5
14	File half round second cut 15cm	5
15	Hacksaw frame adjustable 20-30cm	5
16	Safety goggles	5
17	Dot slot punch	5
<u>TOOLS – INSTRUMENTS & GENERAL SHOP OUTFIT PER UNIT</u>		
18	Rule steel 30 cm to read metric.	2
19	Flat surface 45cm x 45 cm	1
20	Marking table 91 x 91 x 122 cm	1
21	Universal scribing block 22 cm	1
22	Block – vee pair 7 cm and 15 cm with clamps	1
23	Angle plate 10 x 20 cm	1
24	Punch letter 3 mm set	1
25	Punch number set 3 mm	1
26	Punch hollow 6 mm to 19 set of 5	1
27	Punch round 3 mm x 4 mm set of 2	1
28	Drill twist SS 1.5 to 12 mm by 0.4mm	1 set
29	Taps and dies complete set in box (Metric)	1
30	File warding 15 cm smooth	2
31	File knife edge 15cm smooth	2
32	File Cut saw 15cm smooth	2
33	File feather edge 15cm smooth	2
34	File triangular 15 cm smooth	2
35	File round 20 cm second cut	2
36	File square 15cm second cut	2
37	File square 25cm second cut	2
38	Feeler gauge 10 blades.	1 set
39	File triangular 20cm second cut	2
40	File flat 30 cm second cut	2
41	File flat 20 cm bastard	2
42	File flat 30 cm bastard	2
43	File Swiss type needle set of 12	1

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
44	File half round 25 cm second cut	2
45	File half round 25 cm bastard	2
46	File round 30cm bastard	2
47	File hand 15 cm second cut	2
48	Card file	2
49	Stone carborandum 15 cm x 5cm x 4 cm	1
50	Can oil 0.25 litres.	1
51	Plier combination 15 cm	1
52	Spanner adjustable 15 cm	1
53	Glass magnifying 7 cm	1
54	Clamp "C" 10 cm	1
55	Reamer adjustable max.9mm,12mm,19mm-set of 3	1 set
56	Scraper flat 15 cm	1
57	Scraper 3 corner 15 cm	1
58	Scraper half round 15 cm	1
59	Extractor stud EZY-out	1
60	Set Combination 30 cm	1
61	Micrometer 0-25 mm outside	1
62	Micrometer 25-50 mm outside	1
63	Micrometer inside 25 mm to 50 mm with extensions rods	1
64	Vernier caliper 20 cm	1
65	Vernier height gauge 30 cm	1
66	Vernier bevel protractor	1
67	Drill twist T/S 6 mm to 25 mm / 1.5 mm	1 set
68	Drill chuck 12mm	1
69	Pipe wrench 40 cm	1
70	Machine Vice 15 cm	1
71	Sleeve drill Morse 0-1, 1-2, 2-3.	1 set
72	Vice bench 12 cm jaw	20
73	Bench working 240 x 120 x 60 cm	5
74	Fire extinguisher (for 4 Units)	2
75	Fire buckets	2
76	Hand hammer 1 kg. With handle	1

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
77	Hammer smith 2kg with handle	1
78	Tong round	1
79	Tong flat	1
80	Smith's square 45 cm x 30cm	1
81	Cold set rodded	1
82	Swages top & bottom 12mm/19mm 25mm (pair)	1 each
83	Swages block 35 x 35 x 12cm	1
84	Flatter (rodded) 55mm square	1
85	Fuller top & bottom 6mm/9mm (pair)	1Set
86	Anvil 50 Kg	2
87	Anvil stand	2
88	Shovel	2
89	Trammel	1
90	Rake	2
91	Quenching tank	1 (To be made in the Institute)
92	Poker	2
93	Hard die	2
94	Leather apron	2
95	Prick punch	2
96	Mallet	2
97	Snips straight	2
98	Setting hammer with handle	2
99	Planishing hammer	2
100	Snip bent 25cm	2
101	Stake hatchet	2
102	Stake grooving	2
103	Gauge imperial sheet	1
104	Dial test indicator .01 mm on stand	1
105	Sine bar 125 mm	1
106	Lathe tools H.S.S. tipped set	1
107	Lathe tools bit 6 mm x 75 mm	1
108	Lathe tools bit 7 mm x 75 mm	1

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
109	Lathe tools bit 9 mm x 85 mm	1
110	Arm strong type tool bit holder RH.	1
111	Arm strong type tool bit holder L.H	1
112	Arm strong type tool bit holder straight	1
113	Comparator stand with dial indicator	1
114	Transformer welding set 300 amps – Continuous welding Current with all accessories and electrode holder	1 set
115	Welding cable to carry 400 amps with flexible rubber cover	10 meters.
116	Lugs for cable	2
117	Earth clamps	2
118	Arc welding table (all metal top) 122cm x 12 cm x 60cm with positioner	1
119	Oxy acetylene gas welding set equipment with hoses, regulators and other accessories	1 Set
120	Gas welding with positioner	1
121	Welding torch tips of different sizes	1 Set
122	Gas lighter	3
123	Trolley for gas cylinder	1
124	Chipping hammer	1
125	Gloves (leather)	2 Pairs
126	Leather apron	2
127	Welding torch nozzles 5 to 10 sizes	1 Set
128	Spindle key for cylinder valve	1
129	Welding goggles	2 Pairs
130	Welding helmet with colored glass	2
131	Tip cleaner	4 Sets
132	Drilling machine pillar sensitive 0-20 mm cap with swivel table motorized with chuck & key.	1
133	Drilling machine bench sensitive 0-12 mm cap motorized with chuck and key	1

SL.NO	NAME OF THE ITEMS	QUANTITY REVISED
134	Forge portable hand blower 38 cm to 45 cm	1
135	Grinding machine (General purpose) D.E. pedestal with 20 cm dia. Wheels rough and smooth with twist drill grinding attachment .	1
136	Lathe all geared head stock S.S and S.C. height of Centre over bed 15 cm gap head complete with accessories e.g. pump, all fitting and splash guard driving plate with drives, face plate 3 jaw and 4 jaw chucks fixed and traveling steady compound turret tool post, taper turning attachment, fixed and running centers, driving dogs straight and bent tails.	1