

SYLLABUS FOR THE TRADE OF FITTER

First Semester
(Semester Code no. FTR - 01)

Duration : Six Month

| Week No. | Trade Practical | Trade Theory |
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| 1. | <p>Importance of trade training, List of tools & Machinery used in the trade. Health & Safety: Introduction to safety equipments and their uses. Introduction of first aid, operation of Electrical mains.</p> <p>Occupational Safety & Health Importance of housekeeping & good shop floor practices. Health, Safety and Environment guidelines, legislations & regulations as applicable. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Basic safety introduction, Personal protective Equipments(PPE):- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Use of Fire extinguishers.</p> | <p>Importance of safety and general precautions observed in the in the industry/shop floor. All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures. Soft Skills: its importance and Job area after completion of training. Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Introduction to 5S concept & its application. Response to emergencies eg; power failure, fire, and system failure.</p> |
| 2. | <p>Identification of tools & equipments as per desired specifications for marking & sawing. Selection of material as per application Visual inspection of raw material for rusting, scaling, corrosion etc., Marking out lines, gripping suitably in vice jaws, hacksawing to given dimensions, sawing different types of metals of different sections.</p> | <p>Linear measurements- its units, dividers, calipers, hermaphrodite, centre punch, dot punch, their description and uses of different types of hammers. Description, use and care of 'V' Blocks, marking off table.</p> |
| 3. | <p>Filing Channel, Parallel. Filing- Flat and square (Rough finish). Filing practice, surface filing, marking of straight and parallel lines with odd leg calipers and steel rule, marking practice with dividers, odd leg calipers and steel rule (circles, arcs, parallel lines).</p> | <p>Bench vice construction, types, uses, care & maintenance, vice clamps, hacksaw frames and blades, specification, description, types and their uses, method of using hacksaws. Files- specifications, description, materials, grades, cuts, file elements, uses. Measuring standards (English, Metric Units), angular measurements, subdivisions, try square,</p> |

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| | | ordinary depth gauge, protractor- description, uses and cares. |
| 4. | Marking off straight lines and arcs using scribing block and dividers, chipping flat surfaces along a marked line. | Marking off and layout tools, dividers, scribing block, odd leg calipers, punches- description, classification, material, care & maintenance. |
| 5. | Marking, filing, filing square, use of tri-square. | Calipers- types, material, constructional details, uses, care & maintenance of cold chisels- materials, types, cutting angles. |
| 6&7 | Marking according to simple blue prints for locating, position of holes, scribing lines on chalked surfaces with marking tools, finding center of round bar with the help of 'V' block and marking block. Joining straight line to an arc. | Marking media, marking blue, Prussian blue, red lead, chalk and their special application, description. Use, care and maintenance of scribing block. |
| 8. | Chipping, Chip slots & oils grooves (Straight). Filing flat, square, and parallel to an accuracy of 0.5mm. Chip curve along a line-mark out, key ways at various angles & cut key ways. | Surface plate and auxiliary marking equipment, 'V' block, angle plates, parallel block, description, types and uses, workshop surface plate- their uses, accuracy, care and maintenance. Types of files- convexing, taper, needle, care and maintenance of files, various types of keys, allowable clearances & tapers, types, uses of key pullers. |
| 9. | File thin metal to an accuracy of 0.5 mm. Chip & chamfer, grooving and slotting | Physical properties of engineering metal: colour, weight, structure, and conductivity, magnetic, fusibility, specific gravity. Mechanical properties: ductility, malleability hardness, brittleness, toughness, tenacity, and elasticity. |
| 10. | Saw along a straight line, curved line, on different sections of metal. Straight saw on thick section, M.S. angle and pipes. | Power Saw ,band saw, Circular saw machines used for metal sections cutting |
| 11. | File steps and finish with smooth file accuracy ± 0.25 mm. File and saw on M.S. Square and pipe. | Micrometer- outside and inside – principle, constructional features, parts graduation, leading, use and care. Micrometer depth gauge, parts, graduation, leading, use and care. Digital micrometer. |
| 12. | File radius along a marked line (Convex & concave) & match. Chip sheet metal (shearing). Chip step and file. | Vernier calipers, principle, construction, graduations, reading, use and care. Vernier bevel protractor, construction, graduations, reading, use and care, dial Vernier Caliper, Digital vernier caliper. |
| 13. | Mark off and drill through holes, drill and tap on M.S. flat, Punch letter and number (letter punch and number punch), use of different punches. | Drilling processes: common type (bench type, pillar type, radial type), gang and multiple drilling machine. Determination of tap drill size. |

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| 14. | Revision & Test (Two days) Prepare forge. Fire for heating metals. Forge a square rod from round stock. Judge the forging temperature of various metals. | Revision & Test Safety precautions to be observed in a smith shop, forge - necessity, description uses, fuel used for heating, bellows blowers, description and uses |
| 15. | Forge M.S. round rod to square Forge flat chisel, grind. | Anvil and swage blocks. Description and uses. Forging tools- hammers- band and sledge, description and uses. Chisels, set hammers, flatters, hardier, fuller swage & uses. Measuring and checking tools- steel rule, brass rule, calipers, try square, description and uses. General idea about the main operations performed in a forging shop such as upsetting drawing, twisting, bending, punching, drilling, and welding. |
| 16. | Forge – punches, screw drivers, chisels, grind them to shape and heat treat to requirement, bending metals to angles, curves & twisting, Preparation of brackets. | Metallurgical and metal working processes such as Heat treatment, various heat treatment methods -normalizing, annealing, hardening, case hardening and tempering. Power hammer – construction, features, method of operating and uses. |
| 17. | Marking of straight lines, circles, profiles and various geometrical shapes and cutting the sheets with snips. Marking out of simple development, marking out for flaps for soldering and sweating. | Safety precautions to be observed in a sheet metal workshop, sheet and sizes, Commercial sizes and various types of metal sheets, coated sheets and their uses as per BIS specifications. |
| 18-19. | Make various joints: wiring, hemming, soldering and brazing, form locked, grooved and knocked up single hem straight and curved edges form double hemming,. Punch holes-using hollow and solid punches. Do lap and butt joints. | Marking and measuring tools, wing compass, Prick punch, tin man's square tools, snips, types and uses. Tin man's hammers and mallets type-sheet metal tools, Soldering iron, types, specifications, uses. Trammel- description, parts, uses. Hand grooves- specifications and uses. |
| 20. | Bend sheet metal into various curvature form, wired edges- straight and curves, fold sheet metal at angle using stakes. Bend sheet metal to various curvatures. Make simple Square, container with wired edge and fix handle. | Stakes-bench types, parts, their uses. Various types of metal joints, their selection and application, tolerance for various joints, their selection & application. Wired edges - |
| 21. | Make square tray with square soldered corner Practice in soft soldering and silver soldering. | Solders-composition of various types of solders, and their heating media of soldering iron, fluxes types, selection and application-joints |

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| 22. | <p>Make riveted lap and butt joint. Make funnel as per development and solder joints. Drilling for riveting. Riveting with as many types of rivet as available, use of counter sunk head rivets.</p> | <p>Rivets-Tin man's rivets types, sizes, and selection for various works. Riveting tools, dolly snaps description and uses. Method of riveting, shearing machine- description, parts and uses.</p> |
| 23-25 | Revision | |
| 26 | Examination | |

SYLLABUS FOR WORKSHOP SCIENCE AND CALCULATION
SEMESTER-I

| Week No | Workshop Science and Calculation |
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| 1 | - Introduction to Iron and Steel. Differences in Iron & steel. |
| 2 | - Introduction to Property and uses of C.I. and wrought Iron. - Iron and steel properties and uses. |
| 3 | - Properties and uses of plain carbon steel and alloy steel. |
| 4 | - Properties and uses of non ferrous metals and alloys Fraction and decimal - conversion fraction decimal and vice-versa. |
| 5 | - Properties and uses of copper, zinc, lead, tin, aluminum. |
| 6-7 | - Composition, properties and uses of brass, bronze, solder, bearing material, timber, rubber etc. |
| 8 | - System of units, British, metric and SI units for length, area, volume capacity, weight, time, angle, their conversions. - Effect of alloying elements in the properties of C.I. & steel. |
| 9 | - Unit of temperature for & related problems. Standard & absolute temp. |
| 10-11 | - Mass, volume, density, weight, sp. Gravity & specific weight. S.I. M.K.S. and F.P.S. units of force, weight etc. their conversion to related problems. |
| 12 | - Inertia, rest and motion, velocity and acceleration. |
| 13 | - Types of forces, its units and Weight calculation. |
| 14 | - Revision & Test - Power and roots Factor, Power base exponents number. Multiplication and division of power and root of a number. Square root of number and problems. |
| 15 | - Heat & temperature, thermometric scales, their conversions. |
| 16-17 | - Work energy and power, their units and applied problems. |
| 18-19 | - Percentage, changing percentage to decimal and fraction and vice versa. Applied problems. |
| 20 | - Problem on percentage related to trade. |
| 21 | - Different types of loads, stress, strain, modulus of elasticity. Ultimate strength, different types of stress, factor of safety, examples. |
| 22 | - Ratio & proportion- Ratio, finding forms ratio proportions, direct proportion and indirect proportion. Application of ratio and proportion & related problems. |
| 23-25 | Revision |
| 26 | Examination |

SYLLABUS FOR ENGINEERING DRAWING
SEMESTER-I

| Week No | Engineering Drawing |
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| 1-2 | - Engineering Drawing-- introduction to Engg. Drawing and its importance. |
| 3 | - Use of drawing instruments –Drawing of straight, inclined and curved lines. |
| 4 | - Exercise on linear and angular measurements. |
| 5 | - Types of lines their meaning & application as per BIS SP: 46-2003. |
| 6-7 | - Simple conventional symbols for material and parts as per BIS SP: 46-2003. - Geometrical construction of rectangles, square, circles. |
| 8 | - Geometrical construction of polygon and ellipse, parabola & hyperbola. |
| 9 | - Geometrical construction of involutes, oval, and helix. |
| 10-11 | - Free hand sketching of straight lines, rectangles, circles, square, polygons, ellipse. |
| 12 | - Standard printing style for letters and numbers as per BIS : SP: 46-2003 using stencils |
| 13 | - Free hand sketching of simple geometrical solids, cube, cone, prism, cylinder, sphere, pyramids. |
| 14 | - Scales- Types & its use. |
| 15 | - Revision & Test - Construction of diagonal scale. |
| 16 | - Simple dimensioning technique, size and location, dimensions of parts, holes angles, taper, screw etc. as per BIS SP: 46-2003. |
| 17 | - Transferring measurements for linear, angular, circular dimensions from the given object to the related free hand sketches using different measuring instruments. |
| 18-19 | - Pictorial drawings, isometric drawings of simple geometrical solids. |
| 20 | - Oblique/orthographic projection of simple geometrical solids. |
| 21 | - Orthographic drawings: Application of both the first angle and third angle. Isometric drawing of simple machined & casting blocks. |
| 22 | - Free hand sketches of trade related hand tools and measuring tools. |
| 23-25 | Revision |
| 26 | Examination |

SYLLABUS FOR EMPLOYABILITY SKILLS

SEMESTER-I

| 1. I.T. Literacy | |
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| Hours of Instruction : 20 Hrs. | Marks Allotted : 20 |
| Computer | - Introduction, Computer and its applications, Hardware and peripherals, Switching on and shutting down of computer. |
| WINDOWS | - Basics of Operating System, WINDOWS, The user interface of Windows OS, Customizing Windows Operating System, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications. |
| MS office | - Basic operations of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creation and Editing of Text, Formatting the Text, Printing document, Insertion & creation of Tables. - Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets |
| INTERNET | - 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), Applications of Internet : Browsing, Searching, Emailing, Social Networking |
| WEB Browser | - Meaning of World Wide Web (WWW), Search Engines with examples, Web Browsing, Accessing the Internet using Web Browser, Downloading Web Pages, Printing Web Pages - Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT – ACT, Importance of information security and IT act, types of cyber crimes. |
| 2. English Literacy | |
| Hours of Instruction: 15 Hrs. | Marks Allotted : 15 |
| Pronunciation | - Phonetics and pronouncing simple words. |
| Listening | - Interpreting conversation and discussions related to everyday life, Responding to spoken instructions in order to carry out requests and commands. |
| Speaking | - Asking and answering simple questions in English to describe people, things, situations and events. |
| Reading | - Reading and interpreting simple sentences, forms, hoardings, sign boards and notices. |
| Writing | - Writing sentences with simple words, reply to everyday office correspondence, - Writing CV & simple application forms. |
| 3. Communication skill | |
| Hours of Instruction: 15 Hrs. | Marks Allotted : 15 |
| Communication Skills | - Definition, Effective communication, Verbal communication, Use of right words, Non verbal communication, Body Languages. |
| Motivation | - Self awareness, Goal setting, Career planning, Values and Ethics |
| Time management | - Managing time effectively through planning |
| Facing Interviews | - Appearance and behaviour in an interview, Do's and don'ts |
| Behavioral Skills | - Attitude, Problem Solving, Thinking Skills, Confidence building |