ITI - FITTER SYLLABUS

- Importance of safety and general precautions observed in the industry/shop floor
- Soft Skills: its importance and job area after completion of training.
- Introduction to First aid.
- Introduction to PPEs.
- Introduction to 5S concept & its application.
- Linear measurements- units of measurements.
- Dividers, calipers, hermaphrodite, centre punch, dot punch, their description.
- Uses of different types of hammers.
- Description, use and care of "V" Blocks, marking off table.
- Bench vice (construction, types, uses, care and 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.
- Angular measurements, sub-divisions, try square, ordinary depth gauge, protractor description, uses and cares.
- Marking media: marking blue, Prussian blue, red lead, chalk - their special application, description.
- Use, care and maintenance of scribing block.
- Physical properties of engineering metal: colour, weight, structure, conductivity, magnetism, fusibility, specific gravity.
- Mechanical properties: ductility, malleability, hardness, brittleness, toughness, tenacity, and elasticity.
- Micrometer- outside and inside - principle, constructional features, parts, graduation, use and care.
- Drilling processes: common type (bench type, pillar type, radial type). gang and multiple drilling machine.
- Determination of tap drill size.
- Anvil and swage blocks - Description and uses.
- Forging tools - hammers - band and sledge, description and uses. Chisels, set hammers, flatters, hardier, fuller swage & uses.

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- Operations performed in a forging shop such as upsetting drawing, twisting, bending, punching, drilling, and welding.
- Heat treatment, various heat treatment methods -normalizing, annealing, hardening, case hardening and tempering.
- Power hammer - construction, features, method of operation and uses.
- Marking and measuring tools, wing compass, prick punch, tin man's square
- Welding description, types and uses
- H.P welding equipment: description, principle, method of operating L.P welding equipment.
- Types of joints-butt and fillet.
- Gases and gas cylinder description, kinds, main difference and uses.
- Setting up parameters for ARC welding machines-selection of welding electrodes
- Oxygen acetylene cutting-machine description, parts, uses.
- Drill- material, types, (Taper shank, straight shank) parts and sizes. Drill angle
- Cutting speed, Feed and R.P.M. for drilling different materials.
- Drill holding devices
- Counter sink, counter bore and spot facing
- Reamer - material, types (Hand and machine reamer), kinds, parts and their uses, determining hole size (or reaming), Reaming procedure.
- Screw threads: terminology, parts, types and their uses.
- Screw pitch gauge: material parts and uses.
- Grinding wheel: Abrasive, grade structures, bond, specification, use, mounting and dressing. Bench grinder parts and use
- Radius gauge, fillet gauge, material, construction.
- Feeler gauge, hole gauge, and their uses.
- Vernier height gauge : material construction, parts, graduations
- Pig Iron : manufacturing process (by using) Blast furnace, types of pig Iron, properties and uses.
- Cast iron: manufacturing process by using (cupola furnace) - types, properties and uses.
- Wrought iron : manufacturing process (Fuddling and Astor process), properties and uses.
- Steel: manufacturing process, plain carbon steels, types, properties and uses.

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- Non-ferrous metals (copper, aluminum, tin, lead, zinc) - properties and uses.
- Preventive maintenance-objective and function, section inspectio, visual and detailed, lubrication survey, system of symbol and colour coding. Revision, simple estimation of materials, use of handbooks and reference table. Possible causes for assembly failures and remedies.
- Assembling techniques such as aligning, bending, fixing, mechanical jointing, threaded jointing, sealing, and torquing. Dowel pins: material, construction, types, accuracy and uses.
- Lathe specifications, and constructional features.
- Lathe main parts descriptions - bed, head stock, carriage, tail stock, feeding and thread cutting mechanisms.
- Lathe cutting tools- Brief study of the nomenclature of Lathe cutting tools and necessity of correct grinding, solid and tipped, throw away type tools
- General turning operations- parallel or straight, turning. Stepped turning, grooving, and shape of tools for the above operations.
- Lapping: Application of lapping, material for lapping tools, lapping abrasives, charging of lapping tools. Surface finish importance, equipment for testing-terms relation to surface finish. Equipment for testing surface quality - dimensional tolerances of surface finish.
- Honing: Application of honing, material for honing, tools shapes, grades, honing abrasives.
- Frosting- its aim and the methods of performance.
- Bearing-Introduction, classification (Journal and Thrust), Description of each, ball bearing: Single row, double row, description of each, advantages of double row. Roller and needle bearings: Types of roller bearing description & use of each
- Synthetic materials for bearing: The plastic laminate materials, their properties and uses in bearings such as phenolic, teflon polyamide (nylon).
- Drilling jig - constructional features, types and uses. Fixtures-Constructional features, types and uses.
- Pipes and pipe fitting- commonly used pipes. Pipe schedule and standard sizes. Pipe bending methods. Use of bending fixture, pipe threads - standard. Pipe threads Die and Tap, pipe vices. Standard pipefitting - methods of fitting or replacing the fitting, repairs and erection on rainwater drainage pipes and household taps and pipe work.

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- Power transmission - by gears, most common form spur gear, set - names of some essential parts of the set - The pitch circles, Diametral pitch, velocity ratio of a gear set, Helical gear, herring bone gears, bevel gearing, spiral bevel gearing, hypoid gearing, pinion and rack, worm gearing, velocity ration of worm gearing. Repair to gear teeth by building up and dovetail method.
- Lubrication and lubricants- Method of lubrication. A good lubricant, viscosity of the lubricant, Main property of lubricant. How a film of oil is formed in a journal. Bearings, method of lubrication-gravity feed, force (pressure) feed, splash lubrication. Cutting lubricants and coolants: Soluble off soaps, suds-paraffin, soda water, common lubricating oils and their commercial names, selection of lubricants.

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