

7. TRADE SYLLABUS

SYLLABUS FOR TURNER TRADE							
	FIRST YEAR						
Duration	Reference Learning Outcome		Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)			
Professional Skill 175 Hrs.; Professional Knowledge 49 Hrs.	Plan and organize the work to make job as per specification applying different types of basic fitting operations & check for dimensional accuracy following safety precautions.[Basic Fitting Operation – Marking, Hack sawing, filing, drilling, taping etc.]	 1. 2. 3. 4. 5. 6. 7. 8. 9. 	Importance of trade training, List of tools & Machinery used in the trade. (1 hr.) Safety attitude development of the trainee by educating them to use Personal Protective Equipment (PPE). (5 hrs.) First Aid Method and basic training. (2 hrs.) Safe disposal of waste materials like cotton waste, metal chips/burrs etc. (2 hrs.) Hazard identification and avoidance. (2 hrs.) Safety signs for Danger, Warning, caution & personal safety message. (1 hr.) Preventive measures for electrical accidents & steps to be taken in such accidents. (2 hrs.) Use of Fire extinguishers. (7 hrs.) Practice and understand precautions to be followed while working in fitting jobs.	All necessary guidance to be provided to the newcomers 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. Importance of safety and general precautions observed in the in the industry/shop floor. Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Response to emergencies e.g.; power failure, fire, and system failure. Importance of housekeeping & good shop floor practices. Introduction to 5S concept & its application. Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations as applicable. (07 Hrs.)			



10	(2 hrs.)Safe use of tools and equipments used in the	
	trade. (1 hr.)	
11	. Identification of tools	Measurement. line standard
	& equipments as per desired	and end standard steel rule-
	specifications for marking &	different types graduation and
	sowing (Hand tools Eitting	limitation Hammor and chicol-
	tools & Moosuring tools) (2	materials types and uses Drick
	tools & Measuring tools) (2	number and coribor (07 line)
12	Colortion of motorial on nor	punch and scriber. (07 HIS.)
12	. Selection of material as per	
	application Visual	
	inspection of raw material	
	for rusting, scaling,	
	corrosion etc. (1 hr.)	
13	. Marking out lines, gripping	
	suitably in vice jaws, hack	
	sawing to given dimensions,	
	sawing different types of	
	metals of different sections.	
	(16 hrs.)	
14	. Practice on hammering,	
	marking out, chipping,	
	chisel grinding. (6 hrs.)	
15	. Filing practice on plain	Vice - types and uses, Files-
	surfaces, right angle by	different types of uses, cut,
	filing. (45 hrs.)	grade, shape, materials etc. Try
16	. Use of calipers and scale	square-different types, parts,
	measurement. (5 hrs.)	material used etc. Calipers-
		types and uses (firm joint).
		(14Hrs.)
17	. Filing at right angle, marking	Vee – block, scribing block,
	& hack sawing. (25 hrs.)	straight edge and its uses.
		Hacksaw-their types & uses. (07
		Hrs.)
18	. Marking operation on flat &	Center punch- materials.
	round job. (10 hrs.)	construction & material uses
10	. Drilling operation: Drill on	Drill machine-different parts
	flat square har and round	Hacksaw blades- sizes different



		 bar of different material (Sensitive drill machine). (15 hrs.) 20. Different threading (BSW, BSP, BA, Metric, UNC, UNF) with the help of taps and dies both external & while tapping. Dies different types and using collet chuck. (19 hrs.) 21. Extraction of broken tap. (6 hrs.) Parts. Hacksaw blades-sizes, different pitch for different materials. Nomenclature of drill. (07 Hrs.) Parts. Hacksaw blades-sizes, different pitch for different materials. Nomenclature of drill. (07 Hrs.) 21. Extraction of broken tap. (6 hrs.)
Professional Skill 50 Hrs.; Professional Knowledge 14 Hrs.	Set different shaped jobs on different chuck and demonstrate conventional lathe machine operation observing standard operation practice. [Different chucks: - 3 jaws & 4 jaws, different shaped jobs: - round, hexagonal, square]	 22. Identify & function of different parts of lathe. Practice on operation of lathe (dry/idle run). (20 hrs.) 23. Setting lathe on different speed and feed. (5 hrs.) 24. Mounting of chuck on machine spindle and unloading -3-jaw chuck & 4-jaw chuck. (15 hrs.) 25. Setting practice on round & square/ hexagonal bar. (3 hrs.) 26. Dismantling and assembling of 3 jaw and 4 jaw chucks. (7 hrs.) 27. Identify & function of lathe in the spinale and spinale and spinale and spinale and spinale and square/ hexagonal bar. (3 hrs.) 26. Dismantling and assembling of 3 jaw and 4 jaw chucks. (7 hrs.) 27. Identify & function of lathe in the spinale and s
Professional Skill 250Hrs.; Professional Knowledge 70Hrs.	Prepare different cutting tool to produce jobs to appropriate accuracy by performing	 27. Turning of round stock and square/hexagonal as per availability on 4-jaw independent chuck. (15hrs.) 28. Turning of round stock on 3- jaw self centering chuck. Tumbler gear set. 27. Turning of round stock and the drivers, merit and demerit. Description in demerit. Description in details-head stock- cone pulley type- all geared type-



different turning		(10hrs.)	Reducing speed-necessary &
operations.			uses. Back Gear Unit –its
[Different cutting			construction use. (07Hrs.)
tool – V tool, side	29.	Grinding of R.H. and L.H., V-	Lathe cutting tool-different
cutting, parting,		tool, side cutting tools,	types, shapes and different
thread cutting (both		parting tool. (15 hrs.)	angles (clearances and rake),
LH & RH),	30.	Checking of angles with	specification of lathe tools. (07
Appropriate		angle gauge / bevel	Hrs.)
accuracy: -		protractor. (1 hr.)	
±0.06mm, Different	31.	Grinding of "V" tools for	
turning operation –		threading of Metric 60-	
Plain, facing,		degree threads. (9 hrs.)	
drilling, boring	32.	Facing operation to correct	Combination drill- appropriate
(counter &		length (10hrs.)	selection of size from chart of
stepped), grooving,	33.	Centre drilling and drilling	combination drill. Drill, chuck-
Parallel Turning,		operation to required size.	its uses.
Step Turning,		(05hrs.)	Latha according shuch
parting,	34.	Make square block by	independent colf contering
chamfering, U -cut,		turning using 4-jaw chuck	sollet magnetic etc its
Reaming, internal		and perform drilling, boring	function construction and
recess, knurling.		and grooving operation.	(0.7 Hz)
		(10hrs.)	
	35.	Parallel turning, step	Vernier caliper-its construction,
		turning, parting, grooving,	principle graduation and
		chamfering practice. (48	reading, least count etc. Digital
		hrs.)	vernier caliper.
	36.	Measurement with scale	Outside micrometer -different
		and outside caliper to $\pm \ 0.5$	parts, principle, graduation,
		mm. accuracy. (2 hrs.)	reading, construction. Digital
			micrometer.
			Cutting speed, feed depth of
			cut, calculation involved-speed
			feed R.P.M. etc. recommended
			for different materials. (14 Hrs.)
	37.	Step turning within \pm 0.06	Different types of micrometer,
		mm with different shoulder,	Outside micrometer. Vernier
		U/cut on outside diameter.	scale graduation and reading.
		(15 hrs.)	Sources of error with



		38.	Drilling on Lathe-step	micrometer & how to avoid
			practice. (10 hrs.)	instruments. (07Hrs.)
		39.	Boring practice-Plain.	Drills-different parts, types, size
			Counter& step, internal	etc., different cutting angles,
			recessing. (20 hrs.)	cutting speed for different
		40.	Reaming in lathe using solid	material. Boring tool. Counter -
			and adjustable reamer. (15	sinking and Counter boring.
			hrs.)	Letter and number drill, core
		41.	Make bore by trepanning	drill etc.
			(10 hrs.)	Reamers-types and uses.
		42.	Drill grinding. (5 hrs.)	Lubricant and coolant-types,
				necessity, system of
				distribution, selection of
				coolant for different material:
				Handling and care. (14 Hrs.)
		43.	Turning practice-between	Knurling meaning, necessity,
			centres on mandrel (Gear	types, grade, cutting speed for
			blanks). (20 hrs.)	knurling. Lathe mandrel-
		44.	Fitting of dissimilar	different types and their uses.
			materials- M.S. in brass,	Concept of interchangeability,
			aluminium, in cast iron etc.	Limit, Fit and tolerance as per
			(20 hrs.)	BIS: 919-unilateral and bilateral
		45.	Knurling practice in lathe	system of limit, Fits- different
			(Diamond, straight, helical	types, symbols for holes and
			& square). (10 hrs.)	shafts. Hole basis & shaft basis
				etc. Representation of
				Tolerance in drawing. (14 Hrs.)
Professional	Test the alignment	46.	Checking alignment of lathe	Driving plate. Face plate & fixed
Skill 25 Hrs.;	of lathe by checking		centres such as Levelling,	& traveling steadies-
Professional	different		axial slip of main spindle,	construction and use. Transfer
Knowledge	parameters and		true running of head stock	caliper-its construction and
07 Hrs	adjust the tool post.		centre, parallelism of the	uses. Lathe centers-types and
07 1113.	[Different		main spindle to saddle	their uses. Lathe carrier-
	parameters – Axial		movement, alignment both	function types & uses.
	slip of main spindle,		the centres. (20 hrs.)	Mandrel – Different types and
	true running of	47.	Adjustment of tool post. (3	its use.
	head stock,		hrs.)	Magnetic stand dial indicator,
	parallelism of main	48.	Mounting job in between	its used and care. (07 Hrs.)



	spindle, alignment		centres. (2 hrs.)	
	of both the centres.]			
Professional	Set different	49.	Make taper turning by form	Taper – different methods of
Skill 75 Hrs.;	components of		tool and compound slide	expressing tapers, different
	machine &		swivelling. (25 hrs.)	standard tapers. Method of
	parameters to			taper turning, important
Professional	produce taper/			dimensions of taper. Taper
Knowledge	angular			turning by swiveling compound
21 Hrs.	components and			slide, its calculation. (07 Hrs.)
	ensure proper	50.	Male and female taper	Bevel protector & Vernier bevel
	assembly of the		turning by taper turning	protractor-its function &
	components.		attachment, offsetting tail	reading.
	[Different		stock. (22 hrs.)	
	component of	51.	Matching by Prussian Blue.	Method of taper angle
	machine: - Form		(2 hrs.)	measurement.
	tool, Compound	52.	Checking taper by bevel	Sine bar-types and use. Slip
	slide, tail stock		protector and sine bar. (1	gauges-types, uses and
	offset, taper turning		hr.)	selection. (14 Hrs.)
	attachment.	53.	Make MT3 lathe dead	
	Different machine		centre and check with	
	parameters- Feed,		female part. (Proof	
	speed, depth of cut.		machining) (25 hrs.)	
Professional	Set the different	54.	Turning and boring practice	Method of brazing solder, flux
Skill 75 Hrs.;	machining		on CI (preferable) or steel.	used for tip tools.
	parameter & tools		(23 hrs.)	
Professional	to prepare job by	55.	lip brazing on shank. (2	Basic process of soldering,
Knowledge	different	50	nrs.)	Weiding and brazing. (07 Hrs.)
ZI HIS.	amerent boring	56.	Eccentric marking practice.	vernier height gauge, function,
	Different machine	57	(2 IIIS.)	its function and construction
	parameter Food	57.	(19 brc.)	Corow thread definition
	sneed & denth of	58	(10 IIIS.)	purpose & the different
	cut. Different horing	50.	and V-block (1 hr)	elements
	operation – Plain	59	Perform eccentric horing	Driving plate and lathe carrier
	stepped & eccentric]		(18 hrs.)	and their usage. Fundamentals
		60.	Make a simple eccentric	of thread cutting on lathe.
		-	with dia. of 22mm and	Combination set-square head.
			throw/offset of 5mm. (11	Center head, protractor head-



Image: Set in the different is skill 250Hrs; Set the different machining is parameters to produce different threade threaded is parameters to produce different threaded is parameters. Skill 250Hrs; Set the different is parameters to produce different threaded is proach method) Different types of screw thread is parameters. Application of each is produce different threaded is proach method) Professional Knowledge 70Hrs. threaded Knowledge is proper is papelying method/ is plug gauge. (16hrs.) Chain gear formula calculation. Skill 250Hrs. applying method/ is plug gauge. (16hrs.) Different methods of forming is plug gauge. (16hrs.) Different methods of forming is plug gauge. (16hrs.) 70Hrs. Skw, Metric, Square, ACME, Buttress.] Metric, Square, ACME, Buttress.] Setting of male & female threaded components. (BSW) (4hrs.) Calculations involving driverdifterent is proach method.) 63. Fitting of male & female threade is components (BSW) (4hrs.) Setting of male & female threaded is plug gauge. (16hrs.) Thread to be cut. (14Hrs.) 64. Prepare stud with nut (standard size). (14hrs.) Setting of male & female threaded is plug for "V" tools for thread has proach methor.) Thread chasing dial function, threading of Metric 60-
Professional Skill 250Hrs.; Set the different machining parameters 61. Screw thread cutting (B.S.W) external (including angular approach method) Different types of screw thread- their forms and elements. Application of each type of thread. Drive train. Professional Knowledge 70Hrs. threaded R/H & L/H, checking of thread by using screw thread gauge and thread type of thread. Drive train. Rowledge 70Hrs. components thread thread Different methods of forming plug gauge. (16hrs.) technique and test for proper assembly of the components. 62. Screw thread cutting (B.S.W) internal R/H & L/H, checking of thread by using screw thread gauge and thread ring gauge. (16hrs.) Calculations involving driver- driven, lead screw pitch and thread ring gauge. (16hrs.) <i>Square, ACME,</i> <i>Buttress.</i>] 63. Fitting of male & female threaded components. (BSW) (4hrs.) thread thread 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for thread ing of Metric 60- Thread chasing dial function, thread ing of Metric 60-
Skill 250Hrs.; machining (B.S.W) external (including thread-their forms and angular approach method) thread-their forms and elements. Application of each type of thread. Drive train. Professional threaded R/H & L/H, checking of thread by using screw thread gauge and thread plug gauge. (16hrs.) Chain gear formula calculation. 70Hrs. components applying method/ technique and test for proper assembly of the components. [Different thread: - 62. Screw thread cutting finding core dia., gear train (simple gearing) calculation. 85W, Metric, Strew thread gauge and thread gauge and thread screw pitch and thread ring gauge. (16hrs.) Calculations involving driver-driver, lead screw pitch and thread ring gauge. (16hrs.) 85W, Metric, Striting of male & female threaded components. (BSW) (4hrs.) Fitting of male & female threaded components. (BSW) (4hrs.) Fitting of male & female threaded components (BSW) (4hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for thread chasing dial function, threading of Metric 60- Thread chasing dial function, thread ing of Metric 60-
Professional parameters to angular approach method) elements. Application of each Knowledge threaded Knowledge components thread gauge and thread Chain gear formula calculation. 70Hrs. applying method/ plug gauge. (16hrs.) Different methods of forming 62. Screw thread suge and thread (simple gearing) calculation. of the components. (B.S.W) internal R/H & L/H, calculations involved in BSW, Metric, Screw thread gauge and thread to be cut. (14Hrs.) Square, ACME, Fitting of male & female thread to be cut. (14Hrs.) 63. Fitting of male & female thread to be cut. (14Hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for Thread chasing dial function, threading of Metric 60-
Professional produce different R/H & L/H, checking of type of thread. Drive train. Knowledge components thread gauge and thread Different methods of forming applying method/ plug gauge. (16hrs.) threads. Calculation involved in for proper assembly 62. Screw thread cutting finding core dia., gear train of the components. (B.S.W) internal R/H & L/H, Calculations involving driver- BSW, Metric, Screw thread gauge and thread Calculations involving driver- BSW, Metric, Stitting of male & female thread to be cut. (14Hrs.) BSW, (Metric, Fitting of male & female thread to be cut. (14Hrs.) 63. Fitting of male & female thread to be cut. (14Hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for Thread chasing dial function, threading of Metric 60-
Professional Knowledge 70Hrs. threaded thread by using screw Chain gear formula calculation. Professional Knowledge 70Hrs. applying method/ technique and test for proper assembly of the components. bitmead gauge and thread Different methods of forming threads. Calculation involved in Ipifferent thread: - BSW, Screw thread gauge and thread finding core dia., gear train Square, ACME, Buttress.] 63. Fitting of thread by using threaded components. Calculations involving driver- driven, lead screw pitch and threaded components. 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for Thread chasing dial function, threading of Metric 60-
Knowledge 70Hrs. components applying method/ technique and test for proper assembly of the components. [Different thread: - BSW, Metric, Square, ACME, Buttress.] thread gauge and thread plug gauge. (16hrs.) Different methods of forming threads. Calculation involved in finding core dia., gear train (B.S.W) internal R/H & L/H, checking of thread by using screw thread gauge and thread ring gauge. (16hrs.) 63. Fitting of male & female threaded components. [BSW) (4hrs.) 63. Fitting of male & female threaded components. (BSW) (4hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for threading of Metric 60- Thread chasing dial function, construction and use.
70Hrs. applying method/ technique and test for proper assembly of the components. [Different thread: - plug gauge. (16hrs.) threads. Calculation involved in finding core dia., gear train (8.S.W) internal R/H & L/H, checking of thread by using screw thread gauge and thread ring gauge. (16hrs.) finding core dia., gear train (simple gearing) calculation. BSW, Metric, Square, ACME, Buttress.] 63. Fitting of male & female threaded components (BSW) (4hrs.) thread to be cut. (14Hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for threading of Metric 60- Thread chasing dial function, thread ing gof Metric 60-
 technique and test for proper assembly of the components. [Different thread: - BSW, Metric, Buttress.] 62. Screw thread cutting (B.S.W) internal R/H & L/H, checking of thread by using screw thread gauge and thread ring gauge. (16hrs.) 63. Fitting of male & female thread to be cut. (14Hrs.) 63. Fitting of male & female thread to be cut. (14Hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for thread chasing dial function, threading of Metric 60-
for proper assembly of the components. [Different thread: - BSW, Metric, Square, ACME, Buttress.](B.S.W) internal R/H & L/H, checking of thread by using screw thread gauge and thread ring gauge. (16hrs.)(simple gearing) calculation. Calculations involving driver- driven, lead screw pitch and thread to be cut. (14Hrs.)Square, ACME, Buttress.]63. Fitting of male & female threaded components (BSW) (4hrs.)threaded components (BSW) (4hrs.)64. Prepare stud with nut (standard size). (14hrs.)65. Grinding of "V" tools for threading of Metric 60- construction and use.
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[Different thread: - BSW, Metric, Square, ACME, Buttress.]screw thread gauge and thread ring gauge. (16hrs.)driven, lead screw pitch and thread to be cut. (14Hrs.)63. Fitting of male & female threaded components (BSW) (4hrs.)components (BSW) (4hrs.)driven, lead screw pitch and thread to be cut. (14Hrs.)64. Prepare stud with nut (standard size). (14hrs.)65. Grinding of "V" tools for threading of Metric 60- construction and use.
BSW, Square, Buttress.]Metric, ACME, Buttress.]thread ring gauge. (16hrs.) 63. Fitting of male & female threaded components (BSW) (4hrs.)thread to be cut. (14Hrs.)64. Prepare stud with nut (standard size). (14hrs.)65. Grinding of "V" tools for threading of Metric 60- construction and use.
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Buttress.] threaded components (BSW) (4hrs.) 64. Prepare stud with nut (standard size). (14hrs.) 65. Grinding of "V" tools for threading of Metric 60- construction and use.
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threading of Metric 60- construction and use.
degree threads and check Calculation involving pitch
with gauge. (3 hrs.) related to ISO profile.
66. Screw thread cutting Conventional chart for different
(External) metric thread- profiles, metric, B.A., With
tool grinding. (15 hrs.) worth, pipe etc. Calculation
67. Screw thread (Internal) involving gear ratios and
metric & threading tool gearing (Simple & compound
grinding. (16 hrs.) gearing). Screw thread
68. Fitting of male and female micrometer and its use.
thread components (Metric) (14Hrs.)
(2 hrs.)
69. Make hexagonal bolt and
nut (metric) and assemble.
(14 hrs.)
70. Cutting metric threads on Calculation involving gear ratios
inch lead screw and inch metric threads cutting on inch
threads on Metric Lead L/S
Screw. (25 hrs.) Lathe and vice-versa. (07 Hrs.)



		71. Practice of negative rake Tool life, negative	e top rake-its
		tool on non-ferrous metal application and	performance
		and thread cutting along with respect to	positive top
		with fitting with ferrous rake (07 Hrs.)	positive top
		metal (25 hrs.)	
		72 Cutting Square thread Calculation inv	olving tool
		/Z. Cutting Square tilleau Calculation inv	dia nitah
		(External) (10 firs.) Thickness, core	dia., pitch
		73. Cutting Square thread proportion, depth	of cut etc. of
		(Internal). (18 nrs.) sq. thread. (14 Hrs	5.)
		74. Fitting of male and female	
		Square threaded	
		components. (2 hrs.)	
		75. Tool grinding for Square	
		thread (both External &	
		Internal). (2 hrs.)	
		76. Make square thread for	
		screw jack (standard) for	
		minimum 100mm length	
		bar. (12 hrs.)	
		77. Acme threads cutting (male Calculation involv	ved – depth,
		& female) & tool grinding. core dia., pitch p	roportion etc.
		(08 hrs.) of Acme thread.	
		78. Fitting of male and female Calculation invo	lved depth,
		threaded components.(7 core dia., pitch pr	oportion, use
		hrs.) of buttress thread	. (07 Hrs.)
		79. Cut Acme thread over 25	
		mm dia. rod and within	
		length of 100mm. (10	
		hrs.)	
		80. Buttress threads cutting Buttress thread cu	itting (male &
		(male & female) & tool female) & tool gri	nding(07Hrs.)
		grinding. (13hrs.)	
		81. Fitting of male & female	
		threaded components. (2	
		hrs.)	
		82. Make carpentry vice lead	
		screw.(10hrs.)	
Professional	Set the different	83. Make job using different Different lathe	accessories,
	machining	lathe accessories viz., their use and care	. (14 Hrs.)



Skill 50 Hrs.;	parameter & lathe		driving plate, steady rest,	
Duefersienel	accessories to		dog carrier and different	
Professional	produce		centres. (30hrs.)	
Knowledge	components	84.	Make test mandrel	
14 Hrs.	applying techniques		(L=200mm) and counter	
	and rules and check		bore at the end. (20 hrs.)	
	the accuracy.			
	[Different			
	machining			
	parameters: -			
	Speed, feed & depth			
	of cut; Different			
	lathe accessories: -			
	Driving Plate,			
	Steady rest, dog			
	carrier and different			
	centres.]			
Professional	Plan and perform	85.	Balancing, mounting	Lubricant-function, types,
Skill 50 Hrs.;	basic maintenance		&dressing of grinding wheel	sources of lubricant. Method of
Duefersienel	of lathe & grinding		(Pedestal). (10hrs.)	lubrication. Dial test indicator
Protessional	machine and	86.	Periodical lubrication	use for parallelism and
Knowledge	examine their		procedure on lathe. (20	concentricity etc. in respect of
14 Hrs.	functionality.		hrs.)	lathe work Grinding wheel
		87.	Preventive maintenance of	abrasive, grit, grade, bond etc.
			lathe. (20 hrs.)	(14 Hrs.)
In-plant traini	ng / Project work			
Broad area:				
a)	Drill extension socket			
b)	conical brush			

c) V-belt pulley

- d) Tail Stock Centre (MT 3)
- e) Taper ring gauge
- f) Sprocket
- g) Socket spanner



SYLLABUS FOR TURNER TRADE							
	SECOND YEAR						
Duration	Reference Learning Outcome		Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)			
Professional Skill 125 Hrs.; Professional Knowledge 45Hrs.	Plan & set the machine parameter to produce precision engineering component to appropriate accuracy by performing different turning operation. [Appropriate accuracy - ±0.02mm/ (MT - 3) (proof turning); Different turning operation – Plain turning, taper turning, boring threading, knurling, grooving, chamfering etc.]	 88. 89. 90. 91. 91. 92. 93. 94. 	Form turning practice by hand. (8 hrs.) Re-sharpening of form tools using bench grinder. (2 hrs.) Tool machine handle turning by combination feed. (15 hrs.) Turn Morse taper plug (different number) and check with ring gauge / suitable MT sleeve. (25 hrs.) Make revolving tail stock centre- Bush type (C-40). (Proof machining) (25 hrs.) Make Morse taper sleeve and check by taper plug gauge. (25 hrs.) Make mandrel/ plug gauge with an accuracy of ±0.02mm using tungsten carbide tools including throw-away tips. (25 hrs.)	Form tools-function-types and uses, Template-purpose & use. Dial test indicator- construction & uses Calculation involving modified rake and clearance angles of lathe tool at above and below the center height. Subsequent effect of tool setting. Jig and fixture-definition, type and use. Chip breaker on tool- purpose and type (09 hrs.) Cutting tool material-H.C.S., HSS, Tungsten. Carbide, Ceramic etc, - Constituents and their percentage. Tool life, quality of a cutting material. (18 hrs.) Cutting speed, feed, turning time, depth of cut calculation, cutting speed chart (tungsten carbide tool) etc. Basic classification of tungsten carbide tips. (09 hrs.)			



Professional	Set & Produce	95.	Setting and turning	Accessories used on face plate
Skill 50 Hrs.;	components on		operation involving face	-their uses. Angle plate-its
	irregular shaped		and angle plate (25 hrs.)	construction & use. Balancing-
Professional	job using different	96.	Make angle plate using	its necessity.
Knowledge	lathe accessories.		face plate. (25 hrs.)	Surface finish symbols used on
18 Hrs.	[Different Lathe			working blueprints- I.S. system
	accessories: - Face			lapping, honing etc. (18 hrs.)
	plate, angle plate]			
Professional	Plan and set the	97.	Holding and truing of	Preventive maintenance, its
Skill 125 Hrs.;	machine using		Crankshaft – single throw	necessity, frequency of
	lathe attachment		(Desirable). (50 hrs.)	lubrication. Preventive
Professional	to produce			maintenance schedule., TPM
Knowledge	different utility			(Total Productive
45 Hrs.	component/ item			Maintenance), EHS
	as per drawing.			(Environment, health, Safety)
	[Different utility			Marking table-construction and
	component/ item –			function. Angle plate-
	Crank shaft (single			construction, eccentricity
	throw), stub arbour			checking. (18 hrs.)
	with accessories	98.	Turning of long shaft using	Roller and revolving steadies,
	etc.]		steady rest (within 0.1	Necessary, construction, uses
			mm). (25 hrs.)	etc. (09 hrs.)
		99.	Use of attachments on	Different types of attachments
			lathe for different	used in lathe.
			operations. (25 hrs.)	Various procedures of thread
		100.	Turning standard stub	measurement thread screw
			arbor with accessories	pitch gauge.
			collar, tie rod, lock nut. (25	Screw thread micrometer,
			hrs.)	microscope etc. (18 hrs.)
Professional	Set the machining	101.	Perform eccentric boring	Tool maker's button and its
Skill 100 Hrs.;	parameters and		and make male & female	parts, construction and uses,
Drefessional	produce &		eccentric fitting. (15 hrs.)	telescopic gauge its
Protessional	assemble	102.	Position boring using tool	construction and uses. (09 hrs.)
Knowledge	components by		maker's button. (10 hrs.)	
30 HIS.	performing	103.	Boring and stepped boring	Inside micrometer principle,
	different boring		(within ± 0.05 mm) (15	construction graduation,
	operations with an		hrs.)	reading, use etc. (Metric &
	appropriate	104.	Cutting of helical grooves	Inch.) (09 hrs.)
	accuracy. [Different		in bearing and bushes (Oil	



	boring operation –	groove) (10 hrs.)	
	eccentric boring, stepped boring:	105. Turning & boring of split	Care for holding split bearing.
	appropriate	and fixture)(50 hrs.)	(18 hrs.)
	accuracy -		
	±0.05mm]		
Professional	Calculate to set	106. Cutting thread of 8 and 11	Calculation involving fractional
Skill 125 Hrs.;	machine setting to	1PI. (25 hrs.)	threads. Odd & even threads.
Professional	complex threaded	107. Multi start thread cutting	Multiple thread function, use,
Knowledge	component and	(B.S.W.) external &internal.	different between pitch & lead,
45 Hrs.	check for	(25 hrs.)	formulate to find out start,
	functionality.		pitch, lead. Gear ratio etc. (09
	[Different complex		hrs.)
	threaded	108. Multi start thread cutting	Indexing of start - different
	nut. multi start	(Metric) (External &	start thread Setting of a lathe
	threads (BSW,		calculation for required change
	Metric & Square)]		wheel (09 hrs.)
		109. Multi-start thread cutting,	Calculation involving shape of
		square form (Male &	tool, change wheel, core dia
		Female). (25 hrs.)	etc.
			size pitch, core dia, Etc. (09
			hrs.)
		110. Make half nut as per	Helix angle, leading angle &
		standard lead screw. (25	following angles.
		hrs.)	Thread dimensions-tool shape,
			depth, lead etc. (09 hrs.)
Professional	Set (both job and	111. Personal and CNC machine	CNC technology basics:
Skill 250Hrs.;	tool) CNC turn	Safety: Safe handling of	Difference between CNC and
Professional	centre and produce	tools, equipment and CNC	conventional latnes.
Knowledge	drawing bv	112. Identify CNC machine. CNC	of CNC machines over
90Hrs.	preparing part	console. (5 hrs.)	conventional machines.
	programme.	113. Demonstration of CNC	Machine model, control system
		lathe machine and its parts	and specification.
		- bed, spindle motor and	



		drive, chuck, tailstock,	Axes convention of CNC
		turret, axes motor and ball	machine - Machine axes
		screws, guide ways, LM	identification for CNC turn
		guides, console, control	centre.
		switches, coolant system,	
		hydraulic system, chip	Importance of feedback devices
		conveyor, steady rest.	for CNC control.
		(10 hrs.)	
:	114.	Working of parts explained	Concept of Co-ordinate
		using Multimedia based	geometry, concept of machine
		simulatorfor CNC parts	axis. (09 hrs.)
		shown on machine. (6	
		hrs.)	
· · · · · · · · · · · · · · · · · · ·	115.	Identify machine over	
		travel limits and	
		emergency stop. (2	
		hrs.)	
:	116.	Conduct a preliminary	Programming – sequence,
		check of the readiness of	formats, different codes and
		the CNC turning centre viz.,	words.
		cleanliness of machine,	Co-ordinate system points and
		referencing – zero return,	simulations.
		functioning of lubrication,	Workpiece zero points and
		coolant level, correct	ISO/DIN G and M codes for
		working of sub-system. (2	CNC.
		hrs.)	Different types of programming
:	117.	Identification of safety	techniques of CNC machine.
		switches and interlocking	Describe the stock removal
		of DIH modes. (1 hr.)	cycle in CNC turning for OD / ID
	118.	Machine starting &	operation.
		operating in Reference	L/H and R/H tool relation on
		Point, JOG and Incremental	speed.
		Modes. (10hrs.)	Describe CNC interpolation,
	119.	Check CNC part	open and close loop control
		programming with simple	systems. Co-ordinate systems
		exercises and using various	and Points.
		programming codes and	Program execution in different
		words. (09hrs.)	modes like manual, single block
	120.	Check the programme	and auto.



practice in simulation software in respective control system. (09hrs.) 121. Absolute and incremental programming assignments and simulations. (09hrs.) 122. Linear interpolation, and Circular interpolation assignments and simulations on software. (10hrs.) programming assignments spindle speed, tool wear, tool life, relative effect of each cutting parameter on tool life. Selection of cutting parameter from a tool manufacturer' catalog for various operations. Process planning & sequencing tool layout & selection and cutting parameters selection
software in respective control system. (09hrs.)Cutting parameters- cutting speed, feed rate, depth of cut constant surface speed, limiting spindle speed, tool wear, tool life, relative effect of each cutting parameter on tool life.122. Linear interpolation, and Circular interpolation assignments and simulations on software. (10hrs.)Selection of cutting parameter from a tool manufacturer' catalog for various operations.Process planning & sequencing tool layout & selection and cutting parameters selectionProcess planning & sequencing tool layout & selection and cutting parameters selection
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tool layout & selection and
cutting narameters selection
Tool path study of machining
operations
Prepare various programs a
per drawing. (18hrs.)
123. Perform Work and tool Tool Nose Radiu
setting: - Job zero/work Compensation (G41/42) and it
coordinate system and tool importance (TNRC). Cuttin
setup and live tool setup. tool materials, cutting too
(15hrs.) geometry – insert types, holde
124. Carryout jaw adjustment types, insert cutting edge
according to Diameter and geometry.
tooling setup on Turret Describe Tooling system fo
(15hrs.) turning
125. CNC turning centre - Setting work and toc
operation in various offsets.
modes: JOG, EDIT, MDI, - Describe the tooling system
SINGLE BLOCK, AUTO. for CNC TURNING Centers.
(15hrs.) - Cutting tool materials fo
126. Program entry. (2hrs.) CNC Turning and it
127. Set the tool offsets, entry applications
of tool nose radius and - ISO nomenclature for turnin
orientation. (15hrs.) tool holders. boring too
128. Conduct work off set holders, indexable inserts.
measurement, Tool off set - Tool holders and inserts fo
measurement and entry in radial grooving, factor



CNC Control. (10hrs.)	grooving, threading, drilling.
129. Make Tool nose radius and	(36 hrs.)
tool orientation entry in	
CNC control. (8hrs.)	
130. Jaw removal and mounting	
on CNC Lathe. (8hrs.)	
131. Manual Data Input (MDI)	
and MPG mode operations	
and checking of zero	
offsets and tool offsets.	
(12hrs.)	
132 Program checking in dry	Prepare various part programs
run, single block modes, (6	as per drawing & check using
hrs)	CNC simulator
133 Checking finish size by over	Processes and Tool selection
sizing through tool offsets	related to grooving drilling
(9 hrs)	horing & threading (27 hrs.)
134 Part program preparation	
Simulation & Automatic	
Mode Execution for the	
aversica on Simple turning	
& Easing (stop turning) (10	
& Facing (step turning) (10	
115.)	
135. Part program preparation,	
Simulation & Automatic	
Mode Execution for the	
exercise on Turning with	
Radius / chamfer with	
INRC. (10 hrs.)	
136. Part program preparation,	
Simulation & Automatic	
Mode Execution of CNC	
Machine for the exercise	
on Blueprint programming	
contours with TNRC. (10	
hrs.)	
137. Machining parts on CNC	
lathe with parallel, taper,	
step, radius turning,	



grooving & threading. (15 hrs.)	
138. Carryout Drilling /Boring	
cycles in CNC Turning. (15	
hrs.)	
(First 60 % of the practice is	
followed by 40 % on	
machine.)	
139. Geometry Wear	- Describe Tapping on CNC
Correction. Geometry and	turning.
wear offset correction. (10	- Programming for
hrs.)	Grooving/Threading on
140. Produce components on	OD/ID in CNC Turning.
CNC Machine involving	- Trouble shooting in CNC
different turning	lathe machine
 Stock removal cycle OD 	turned part quality/
 Drilling / boring cycles 	productivity.
 Stock removal cycle ID 	- Parting off operation
 Carryout threading in 	explanation.
different pitches. (18	- Bar feeding system through
hrs.)	bar feeder.
141. Produce components by	- Input and Output of Data.
involving turning operation	
and part programme	- Use of CAM Programme.
viz	(Optional) (27 hrs.)
 Grooving and thread 	
cutting OD	
 Grooving and thread 	
cutting ID	
Threading cycle OD	
 Sub programs with 	
repetition	
Using Sub Programs &	
Cycles III the Main Program (18 hrs)	
1.0810111. (10.1113.)	



		142. Part off: Part Prog. (4 hrs.)	
		143 Produce job involving	
		nrofile turning threading	
		on taper boring etc	
		operations (22 brs.)	
		operations. (22 ms.)	
		144. Demo on W/C on bar	
		feeding system.	
		(simulation/video) (1 nr.)	
		145. DNC system setup.	
		(Optional)	
		146. Run the machine on DNC	
		mode.(Optional)	
		147. CAM programme	
		execution. (Optional)	
		148. Data input-Output on CNC	
		machine. (2 nrs.)	
Professional	Manufacture and	149. Thread on taper surface	Setting of tools for taper
Skill 100 Hrs.;	assemble	(Vee form). (50 hrs.)	threads-calculation of taper
Professional	components to		setting and thread depth.
Knowledge	produce utility		
36 Hrs.	items by		Heat treatment – meaning &
	performing		procedure hardening,
	different		tempering, carbonizing etc.
	operations &		
	observing principle		Different types of metal used in
	Of		engineering application. (18
	interchangeability		hrs.)
	and check	150. Manufacturing & Assembly	Interchangeability meaning,
	functionality.	of Screw Jack/vice/Box nut	procedure for adoption, quality
	[Utility item: -	by performing different	control procedure for quality
	screw jack/ vice	lathe operation. (To use	production. (09hrs.)
	spinale/ Box nut,	earlier produce screw	
	marking block, arill	Jack). (25 hrs.)	
	CNUCK, COLLET CNUCK	151. Prepare different types of	Importance of Technical English
	etc.; alfferent	documentation as per	terms used in industry –(in
	operations: -	industrial need by different	simple definition only)Technical
	chreading (Square,	methods of recording	forms, process charts, activity
	BSW, ACME,	information. (4 hrs.)	logs in required formats of
	Metric), Thread on	152. Turn Bevel gear blank. (21	industry, estimation, cycle



	taper, different	hrs.)	time, productivity reports, job
	boring (Plain,		cards. (09 hrs.)
	stepped)]		
Professional	Make a process	153. Read a part drawing, make	Terms used in part drawings
Skill 125 Hrs.;	plan to produce	a process plan for turning	and interpretation of drawings
	components by	operation and make	– tolerances, geometrical
Professional Knowledge	performing special	arborwith clamping nut	symbols - cylindricity,
	operations on lathe	(hexagonal). (50hrs.)	parallelism. etc. (18 hrs.)
45 Hrs.	and check for	154. Practice of special	Automatic lathe-its main parts,
	accuracy. [Accuracy	operations on lathes -	types diff. Tools used-circular
	- ±0.02mm or proof	worm gear cutting. (Shaft)	tool etc. (09 hrs.)
	machining &	(25 hrs.)	
	±0.05mm bore;	155. Boring on lathe using soft	Related theory and calculation.
	Special operation –	jaws to make bush with	(18 hrs.)
	Worm shaft cutting	collar (standard) on	
	(shaft) boring,	nonferrous metal and	
	threading etc.]	check with dial bore gauge	
		to accuracy of +/- 0.05	
		mm. (30hrs.)	
		156. Make Arbor support bush.	
		(Proof Machining) (20hrs.)	
In-plant trainii	ng/ Project work (Any	Project to be done on CNC machine	2)
a)	Taper Sunk		
b)	Socket with Split Colle	t	
c)	Screw Jack		
d)	Spindle with Hub		
e)	Morse Taper Eccentric		
f)	Crank Shaft with Taper Sleeve		