



GOVERNMENT OF INDIA  
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP  
DIRECTORATE GENERAL OF TRAINING

**COMPETENCY BASED CURRICULUM**

# TURNER

(Duration: Two Years)

**CRAFTSMEN TRAINING SCHEME (CTS)**

**NSQF LEVEL- 5**



**SECTOR –CAPITAL GOODS AND MANUFACTURING**



Directorate General of Training

# TURNER

(Engineering Trade)

(Revised in 2019)

Version: 1.2

**CRAFTSMEN TRAINING SCHEME (CTS)**

**NSQF LEVEL - 5**

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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## 1. COURSE INFORMATION

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During the two years duration a candidate is trained on subjects Professional Skill, Professional Knowledge, Engineering Drawing, Workshop Science & Calculation and Employability Skills related to job role. In addition to this a candidate is entrusted to make/do project work and Extra Curricular Activities to build up confidence. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task. The practical part starts with basic fitting & turning and executes complex turning operation both in conventional lathe and CNC turn centre at the end of the course. The broad components covered under Professional Skill subject are as below:

**FIRST YEAR:** The practical part starts with basic fitting & different turning including setting of different shaped job on different chucks. The different turning operations – Plain, Facing, Drilling, Boring (counter and stepped) Grooving, Parallel turning, stepped turning, Parting, Chamfering, U-cut, Reaming, Internal recess & Knurling. The skills on grinding of different cutting tools viz., V tool, side cutting, parting and thread cutting (both LH & RH) are also imparted. During this period the testing alignment of lathe by checking different parameters viz., axial slip of main spindle, true running of head stock, parallelism of main spindle and alignment of both the centres are also covered. The observation of all safety aspects is mandatory during execution any task. The safety aspects cover components like OSH&E, PPE, Fire extinguisher, First Aid and in addition 5S being taught.

This section covers setting of different components (Form tool, Compound slide, Tail stock offset, taper turning attachment) & parameters (feed, speed, depth of cut) of lathe for taper/ angular turning of jobs. Different boring operations (plain, stepped and eccentric) are also undertaken to gain the skill in producing components involving such operations. Different thread cutting (BSW, Metric, Square, ACME, Buttress) by setting machining parameters are being taught in the practical. The use different accessories of lathe (Driving Plate, Steady rest, dog carrier and different centres) are also part of the practical training. During this period the basic maintenance and preventive maintenance of lathe and grinding machine are also covered.

**SECOND YEAR:** On achieving above mentioned skill sets the candidate is engaged in producing different precision of engineering component with an appropriate accuracy ( $\pm 0.02\text{mm}$ ). The machining of different irregular shaped job using different lathe accessories and also producing different utility items viz., Crank Shaft (single throw), Stub arbor, etc. are covered to enhance their competency and perform the job as per practical requirement. The machining of different components along with assembly of such components (male & female) by performing different turning activities is also covered. The accuracy achieved is of an accuracy of  $\pm 0.02\text{ mm}$  outside and  $\pm 0.05\text{mm}$  for inside turning.

A dedicated time of 13 weeks devoted for CNC operations which involve setting both job and tools and operating the CNC turn centre to produce components as per drawing by preparing part programmes. The candidate gets enough training both on multi-media-based CNC simulated and on actual intermediate production based CNC machine. The candidate is also imparted training on process plan to produce components by performing special operation on lathe viz., worm shaft cutting and also producing different engineering components viz., drill chuck, collet chuck, screw jack, box nut etc., to develop competency in producing components which is tangible and significant in work and industry ready for executing such work as per demand.

Professional Knowledge subject is simultaneously taught in the same fashion to apply cognitive knowledge while executing task. In addition, components like cutting tools and its specification, method of brazing and soldering, calculation involving gear ratio and gearing, and tool life, lubrication and functions, jigs and fixtures, interchangeability, quality control procedure and technical English are also covered under theory part.

Total three projects need to be completed by the candidates in a group. In addition to above components the core skills components viz., Workshop calculation & science, Engineering drawing, employability skills are also covered. These core skills are essential skills which are necessary to perform the job in any given situation.

***Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.***

### 5.1 LEARNING OUTCOMES (TRADE SPECIFIC)

#### **FIRST YEAR:**

1. 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, tapping etc.]*
2. 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]*
3. Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations. *[Different cutting tool – V tool, side cutting, parting, thread cutting (both LH & RH), Appropriate accuracy: -  $\pm 0.06$ mm, Different turning operation – Plain, facing, drilling, boring (counter & stepped), grooving, Parallel Turning, Step Turning, parting, chamfering, U -cut, Reaming, internal recess, knurling.]*
4. Test the alignment of lathe by checking different parameters and adjust the tool post. *[Different parameters – Axial slip of main spindle, true running of head stock, parallelism of main spindle, alignment of both the centres.]*
5. Set different components of machine & parameters to produce taper/ angular components and ensure proper assembly of the components. *[Different component of machine: - Form tool, Compound slide, tail stock offset, taper turning attachment. Different machine parameters- Feed, speed, depth of cut.]*
6. Set the different machining parameter & tools to prepare job by performing different boring operations. *[Different machine parameter- Feed, speed & depth of cut; Different boring operation – Plain, stepped & eccentric]*
7. Set the different machining parameters to produce different threaded components applying method/ technique and test for proper assembly of the components. *[Different thread: - BSW, Metric, Square, ACME, Buttress.]*
8. Set the different machining parameter & lathe accessories to produce components applying techniques and rules and check the accuracy. *[Different machining parameters: - Speed, feed & depth of cut; Different lathe accessories: - Driving Plate, Steady rest, dog carrier and different centres.]*
9. Plan and perform basic maintenance of lathe & grinding machine and examine their functionality.

## SECOND YEAR:

10. Plan & set the machine parameter to produce precision engineering component to appropriate accuracy by performing different turning operation. [*Appropriate accuracy -  $\pm 0.02\text{mm}$ / (MT - 3) (proof turning); Different turning operation – Plain turning, taper turning, boring threading, knurling, grooving, chamfering etc.*]
11. Set & Produce components on irregular shaped job using different lathe accessories. [*Different Lathe accessories: - Face plate, angle plate*]
12. Plan and set the machine using lathe attachment to produce different utility component/ item as per drawing. [*Different utility component/ item – Crank shaft (single throw), stub arbour with accessories etc.*]
13. Set the machining parameters and produce & assemble components by performing different boring operations with an appropriate accuracy. [*Different boring operation – eccentric boring, stepped boring; appropriate accuracy -  $\pm 0.05\text{mm}$* ]
14. Calculate to set machine setting to produce different complex threaded component and check for functionality. [*Different complex threaded component- Half nut, multi start threads (BSW, Metric & Square)*]
15. Set (both job and tool) CNC turn centre and produce components as per drawing by preparing part programme.
16. Manufacture and assemble components to produce utility items by performing different operations & observing principle of interchangeability and check functionality. [*Utility item: - screw jack/ vice spindle/ Box nut, marking block, drill chuck, collet chuck etc.; different operations: - threading (Square, BSW, ACME, Metric), Thread on taper, different boring (Plain, stepped)*]
17. Make a process plan to produce components by performing special operations on lathe and check for accuracy. [*Accuracy -  $\pm 0.02\text{mm}$  or proof machining &  $\pm 0.05\text{mm}$  bore; Special operation – Worm shaft cutting (shaft) boring, threading etc.*]