

# Lesson Plan (for educators)

## CNC Milling



### Lesson plan - 90 minutes

#### AIM:

To introduce learners to the importance of speed and accuracy in tool measurement and to deepen their understanding of the relationship between tool length offsets and machine positions.

#### ACTIVITY:

In this tool setting task, learners will be provided with a tool list for a component that is to be produced on a CNC Milling machine. They will have to select the correct tool holding for each tool, build the tool assemblies, produce a tool file on the machine and load and measure all tools.

### Suitable for

Students undertaking: Manufacturing Engineering / CNC machining - Level 2 and 3 and SCQF equivalents.

### Resources needed

1. Video & LMS access (link)
2. Task brief
3. Tool List (Sample Supplied - adjust as required)
4. Marking criteria/Scheme
5. Infrastructure List
6. H&S Checklist
7. Skill Fact Sheet (WSUK)
8. End of assessment quiz

### Skills

Self Management, Informed, Reflection, Self Belief, Drive, Maths, Geometry, Efficiency, Productivity, Accurate interpretation of engineering documents, Precision.

### Learning outcomes

After completing this activity learners will be able to:

- create CNC tool files on the appropriate CNC control
- think about how to plan for the task and put a strategy in place that can be used in similar tasks
- recognise the importance of using an accurate tool setting methodology
- select and use appropriate measuring tools and instruments
- explore their own best strategies to produce the task
- learn how to complete the task within time, accurately and to standard
- produce a tool setting sequence that can be followed by others.

### Delivery modes

1. Students can go through the online materials independently – but it is recommended work is completed with guidance/ tuition to ensure a valid activity.
2. You can download and print all relevant resources, access the video demo and deliver the activity in the classroom / workshop.

Section	Timings	Key teaching points
Lesson Plan	5 minutes	Introduce the topic and its relevance to skills competitions and how it directly correlates to the CNC manufacturing industry.
Video OR photo demonstration (ensure descriptors are provided for each photo)	15 minutes	Students watch the video demonstration Students start thinking about how they can plan their work to make the best possible use of time and maintain accuracy.
Task Brief (below)	10 minutes	Familiarise students with the key steps to complete the set task. Steps: <ul style="list-style-type: none"> <li>• watch video / Live demo by the teacher in their own facility</li> <li>• write your own notes on how to load and set tools</li> <li>• see the example of the completed task to standard</li> <li>• plan your sequence of operations for the task</li> <li>• complete the task</li> <li>• mark the task</li> <li>• repeat the task and improve on your score.</li> </ul>
Infrastructure and H&S checklist	5 minutes	Infrastructure List: <ul style="list-style-type: none"> <li>• printed copy of Tooling Sheet Word document</li> <li>• printed copy of tool setup PPT presentation</li> <li>• pen</li> <li>• tool setting clock or equivalent manual tool setting equipment</li> <li>• slip gauges (may not be needed if the probe can reach machine bed to set Z datum)</li> <li>• 5 tool holders (Can be different types)</li> <li>• 5 tools to set, see example tooling sheet</li> <li>• hand tools to tighten tool holders (ER Collet Spanners).</li> </ul>
Task Completion - 1st attempt	60 minutes	Get students to complete the task by following the instructions on the task brief.
Marking Criteria	5 minutes	Provide the marking scheme to the learners and encourage learners to record their received marking on LMS. Please use the marking scheme included in this module. Do not forget to feedback to WorldSkills UK.
Task Completion - repeat	60 minutes	Get students to complete the task by following the instructions on the task brief. Allow them to explore their own ways of completing the task quicker - can they improve their score?