Mechanical carousel 2 Machine Shop (MS) – Synopsis

Scope

- This carousel covers a basic range of machining skills that will prepare the trainee gain the basic knowledge and understanding of the machine tools used to produce precision components. This will provide a foundation for the further development of advanced machining techniques which will be used in further mechanical carousels. The trainees will undertake 3-4 practical projects to develop their machining skills. The projects are **Turning**: 1, Practice Shaft 2, Test Shaft *(3, Plumb Bob Extension task)* **Milling:** 1, Thread Gauge *(2, Dice Extension task)*. The thread gauge can also draw upon the Bench fitting carousel as there is a requirement for some bench work. The projects are realistically achievable in the time scale of the carousel.

Aim

- To successfully manufacture machined components to specification within the specified time scale

Objectives

- Manufacture Machined parts to specification – Using machine tools
- Manufacture parts to specification – Using hand fitting skills
- Inspect and functionally test / modify

Underpinning Knowledge Lectures – Refreshers /Consolidation

- Abrasive Wheels Regulations – If required
- Apply safe working practices, Work-shop/Machine-shop safety
- Project planning
- Safe use of the Centre Lathe
- Safe use of the Milling Machine
- Use Of Digital Readouts
- Measurement

Hand-outs

- Detailed part drawings & Assembly drawing
- HSG17 *(HSE Safety in the use of abrasive wheels)*
- HSG-129 *(HSE Health and safety in engineering workshops)*
- H&S Documentation
- Conversions
- Reading Vernier Scales
- Moore & Wright PDF

Write-ups

- Planning sheets
- Abrasive wheel test
- Inspection sheet
- Project Planning Write-up– Manufacture Of A Test Shaft
- Project Planning Write-up– Manufacture Of A Thread Gauge
- End Test
- ROA

Learning Outcomes

- Be fully conversant with the Health & Safety requirements
- Gain an understanding of Imperial measurement systems
- Be able interpret and understand Engineering drawings
- Be able to plan a project
- Be able to set up and use the lathe properly
- Be able to set up and use the Milling machine properly
- Be able to measure accurately using Imperial and metric systems
- Be able to produce turned components to the required standard
- Be able to produce Milled components to the required standard
- collaborate successfully to solve machining problems
- Working with others as part of a team
- Self-Actualization, self-reliance, confidence - through achievement

Differentiation

- **By Extension** – Additional practical tasks for students who are achieving their objectives –
    1. Give additional attention to detail by inspection and good surface finish.
    2. Peer support for example students with a natural aptitude to specific area can support the other members of the group.
    3. Run of batch parts where the part does not have a unique skill required therefore the group would not need to undertake to meet the criteria.
- **By Group Work** – This will almost definitely need to be adopted due to the amount of repeatability piece parts being manufactured for example there will be a need to configure the milling machine to do a certain task over and over. Rather than de-configure after each operation the students will be encouraged to work in groups to overcome potential bottle necks thus promoting good team work.
- **By Activities** – This has occurred previously and was met by additional activities in the form of CNC milling. The students who had completed ahead of schedule where encouraged to programme and machine to engrave on the thread gauge the required sizes. This involves the students programming and operating the machine as well as the other machining activities. There is also a non CNC option where the name plate can be hand stamped or Etched. This also covers **By Extension**