Mechanical Carousel 3 Manufacture & Assembly (MA) – Synopsis

**Scope**

- Following on from prior learning of the previous mechanical carousels – Machining MS1 & Bench Fitting BF1. The concept is to further develop student skills and knowledge of the manufacturing process from product design to application, by manufacturing a working model Beam Engine. As the project is an actual tangible working model which is realistically achievable in the time scale. The learning outcome will be very positive.

**Aim**

- To successfully manufacture and assemble a functional model Beam Engine within the specified time scale

**Objectives**

- Manufacture piece parts to specification – using hand tools
- Manufacture piece parts to specification – using the centre lathe
- Manufacture piece parts to specification – using the milling machine
- Manufacture piece parts to specification – using the Cnc milling machine
- Assemble piece parts to specification – Using hand fitting skills
- Functionally test and evaluate results / modify

**Underpinning Knowledge Lectures – Refreshers /Consolidation**

- Apply safe working practices, Work-shop/Machine-shop safety
- Safe use of the Centre Lathe
- Safe use of the Milling Machine
- Safe use of Hand Tools
- Measurement –Emphasis on Imperial
- Engineering drawing – ***Dependent on prior learning***
- Project planning

**Hand-outs**

- Detailed part drawings & Assembly drawing
- Detailed Instructions
- Engineering drawing & Sketching

**Write-ups**

- Planning sheets
- Line Types & Projection – ***Dependent on prior learning***
- Inspection sheet
- End test
- ROA

**Experiential Learning -** Learning through practical experience and learning by reflecting on experience.

**Learning through practical experience**

- Learning in a work-based environment – TTE Workshops
- Carrying out case study work – H&S past trends & requirements
- Planning and carrying out practical tasks and write-ups

**Learning through reflecting at all stages of the experience**

- Preparing and planning for the tasks
- Taking stock throughout the tasks
- Reviewing and adapting as necessary
- Reflecting after the task has been completed
- Evaluating, self-assessing and identifying learning points.

**Core Skills Employed**

Of the five Core Skills four are covered:

- **Communication** – *Understanding & Interpreting Engineering Drawings*
- **Numeracy** – *Using Imperial & Si Units to make calculations (non calculator)*
- **Problem Solving** – *Dealing with problems that arise during the manufacturing process*
- **Working with Others** – *Collaborating to work Effectively & Efficiently by seeking advice from the TO whilst working with their peers as part of a team*
- **Information Technology** – *Using Computer Aided Machining & Programming*

**Generic Skills & Attitudes Gained:**

- Understanding of the workplace and the employee's responsibilities, for example H&S, time-keeping, appearance,
- Self-evaluation skills
- Positive attitude to learning
- Flexible approaches to solving problems
- Adaptability and positive attitude to change

**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
- Use the Centre lathe to accurately produce turned components
- Use the Milling machine to accurately produce milled components
- Use the CNC Milling machine to program and produce components
- Use Hand tools to accurately produce fabricated components
- Develop an understanding of the "Whole Picture" through planning, manufacture, assembly and testing
- Working with others as part of a team
- Self-Actualization, self-reliance, confidence - through achievement