



## Level 4 HNC in Mechanical Engineering



This programme provides learners with the advanced skills and knowledge required to work as a technician in an array of sectors across the engineering industry. You will develop an understanding of mechanical system that will enable you to develop processes and products from small component designs to large plants, machinery or vehicles. Throughout the course, you will complete many units including, but not limited to, Mechanical Principles, Thermodynamics, Materials Engineering and Engineering Management.

### What does the course include?

The successful completion of this HNC course will open many doors for you. Here are a few of the options:

- Progression to a Level 5 HND in Mechanical Engineering (2 years)
- Apply for the following jobs within industry:
  - Mechanical Engineer Technician
  - Machine Maintenance Technician
  - Mechanical Design Engineer
  - Quality Improvement Engineer
  - CAD Technician

### Where can this course lead?

### Can't wait to get started? Here are some places to get you on your way:

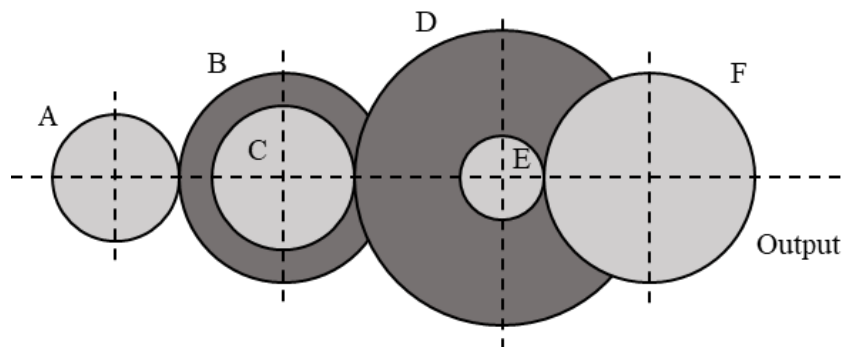
- **Video:** What is Mechanical Engineering?  
<https://www.youtube.com/watch?v=-eyKINDtxUY>
- **Book:** Basics of Mechanical Engineering  
<http://ronney.usc.edu/AME101/AME101-LectureNotes.pdf>
- **Article:** 10 Interesting Facts about Mechanical Engineering  
<https://www.10interestingfacts.com/10-interesting-facts-about-mechanical-engineering.html>

Have a go!

## Activity – Gear Ratios

Gears, sound like magic, but they're simply science in action! They are used for transmitting power from one part of a machine to another. In a bicycle, for example, it's gears (with the help of a chain) that take power from the pedals to the back wheel. Similarly, in a car, gears transmit power from the crankshaft (the rotating axle that takes power from the engine) to the driveshaft running under the car that ultimately powers the wheels.

When designing gear trains, mechanical engineers calculate gear ratios (GR) to assess whether torque is being amplified or velocity increased. Consider the following system:



### Where:

Gear A has 20 teeth

Gear B has 100 teeth

Gear C has 40 teeth

Gear D has 100 teeth

Gear E has 10 teeth

Gear F has 100 teeth

### Problem:

Determine the **GR** of this compound gear train and identify the **direction of rotation** of the output gear, F. Use the following equation:

$$GR = \left( \frac{\text{Number of Teeth B}}{\text{Number of Teeth A}} \right) \times \left( \frac{\text{Number of Teeth D}}{\text{Number of Teeth C}} \right) \times \left( \frac{\text{Number of Teeth F}}{\text{Number of Teeth E}} \right)$$