



# BTEC Level 3 Engineering

## Bridging Tasks and Suggested Reading

### Summer preparation

The purpose of giving you a summer bridging task is:

- I. To provide a bridge from level 2 to level 3 study, and lead into the early stages of the course.
- II. To engage you in independent learning which is required at level 3.
- III. To encourage you to develop your work ethic and commitment to study.
- IV. To measure your suitability for the course and assess your initial levels of achievement.

**Task 1:** There are 5 key Health & Safety terms that crop up throughout the two-year course. It is important that you are aware of their meaning and purpose in engineering.

Define the following key terms, giving a detailed description of the regulations and legislation surrounding them:

HASAWA	PPE	RIDDOR	MHOR	COSHH	Risk Assessment
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### Useful websites:

<https://www.hse.gov.uk/>

**Task 2:** We will be studying a number of mechanical engineering topics that require you to use three manual secondary machining processes. Create a report on all three processes, which includes relevant images or diagrams.

Research the following three manual secondary machining processes:

- Milling Machine
- Lathe
- Pillar Drill

Describe how they operate, the requirements for Health & Safety (PPE, COSHH, RIDDOR, MHOR) and the tools that they use in producing different components. Include in each processes description how they produce different features as well as particular reference to accuracy (e.g. tolerances).

### Potentially useful websites:

Milling Machine Video: [https://www.youtube.com/playlist?list=PLyv4Q1JxT\\_Rh0Fv5loUN9ZTm74V/kxYjhJ](https://www.youtube.com/playlist?list=PLyv4Q1JxT_Rh0Fv5loUN9ZTm74V/kxYjhJ)

Lathe video: <https://www.youtube.com/watch?v=Za0t2Rfjewg>

Pillar Drill Video: <https://www.youtube.com/watch?v=qOJKeuzBc78>

**Task 3:** We will also be studying a number of electronic engineering topics that require you to simulate electronic circuits, build prototype circuits and design and make Printed Circuit Boards (PCB's). Using the links below as a guide describe how a multi-layer PCB is designed and manufactured. Watch the first video all the way through and then use the information and headings on the second link to guide the structure of your report.

Video creating the PCB: [https://www.youtube.com/watch?v=sIV0icM\\_Ujo](https://www.youtube.com/watch?v=sIV0icM_Ujo)

Step by Step instruction video: <https://www.eurocircuits.com/making-a-pcb-pcb-manufacture-step-by-step/>

**Task 4:** Drawing and communication skills Produce a sketchbook of drawings of a range of objects/products. Ensure you experiment with a range of media and techniques, including isometric 3d and different styles of rendering. There are loads of great sketching/drawing tutorials on YouTube e.g. <https://www.youtube.com/watch?v=iVy0qGqmKFU>


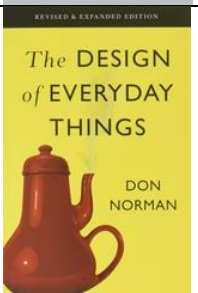
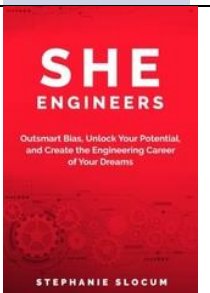
**Task 5:** Development of an existing product Identify a product you currently use. Sketch a range of possible developments that may be seen in this product in 10 years time. You may wish to think about how smart materials may be incorporated. Annotate your sketches to explain your thinking.

**Task 6:** Research product evolution (e.g. mobile phones) Identify a product where there has been clear development over time e.g. the mobile phone. Record the key milestones/developments on a timeline. Explain whether each is an 'incremental' or 'radical' development.

**Task 7:** Disassembly activity (reverse engineering) Carefully disassemble a simple product of your choice. Photograph or sketch each component and explain what each does to ensure the product functions.

**Please bring your work with you to your first lesson.**

**Recommended Reading:**

TO ENGINEER IS HUMAN: THE ROLE OF FAILURE IN SUCCESSFUL DESIGN		WHY BUILDINGS FALL DOWN: HOW STRUCTURES FAIL	
STRUCTURES: OR WHY THINGS DON'T FALL DOWN		THE UNWRITTEN LAWS OF ENGINEERING	
THE DESIGN OF EVERYDAY THINGS		SHE ENGINEERS: OUTSMART BIAS, UNLOCK YOUR POTENTIAL, AND CREATE THE ENGINEERING CAREER OF YOUR DREAMS	
THE EXISTENTIAL PLEASURES OF ENGINEERING		THING EXPLAINER: COMPLICATED STUFF IN SIMPLE WORDS	