



**OVERVIEW**

The Engineering course prepares students for a career in engineering, it provides in depth knowledge of nine sectors and the careers available in all these areas. Students will develop an understanding of how to manufacture products from orthographic drawing, through manufacture to evaluation, using a range of media and materials, from hand tools to CAD, metal to ceramics. Year 10 covers all the theoretical knowledge needed for the external exam through standalone theory lessons and as aspects of the mini synoptic projects. The synoptic projects build up in complexity and content, they are all past synoptic projects, which provide the foundation for success at year 11.

**Autumn**

**Theory - Engineering Disciplines, H&S**

1. Mechanical Engineering
2. Electrical Engineering and Electronic Engineering
3. Aerospace Engineering - **Progression Task - Electrical engineering**
4. Telecommunications Engineering
5. Chemical Engineering
6. Civil Engineering
7. Automotive Engineering **Progression Task - Chemical engineering**
8. Biomedical Engineering
9. **Exam style end of unit assessment**
10. **Progression task – feedback from EoUT**
11. Health and Safety – HASAWA and PPE
12. Manual Handling, COSHH and RIDDOR
13. **Exam style end of unit assessment**
14. **Progression task – feedback from EoUT**

**Synoptic Projects Bridge design – group task**

1. Bridge designs and styles
  2. 2D drawing task
  3. Manufacturing plan/tolerances
  4. Quality assurance/ manufacturing
  5. Manufacturing
  6. Testing
  7. Evaluation/ redesign
- Bottle opener**
1. Draw 3<sup>rd</sup> angle orthographic drawings
  2. Production plan/Risk Assessment
  3. Manufacture – marking out
  4. Manufacture – drill and shape
  5. Manufacture – handle forming
  6. Manufacture – riveting
  7. Finishing/ Evaluation

**Assessment:**

Teacher assessment theory – exam style marking for end of unit tests.

Teacher assessment – Synoptic

AO1 Recall knowledge and show understanding

AO2 Apply knowledge and understanding

AO3 Analyse and evaluate knowledge and understanding

AO4 Demonstrate and apply technical skills and processes

AO5 Manage and evaluate the project

**Spring**

**Theory – Science and maths in engineering.**

1. SI units
2. Current and Luminous Intensity
3. Thermodynamic Temperature **Progression Task -SI units**
4. Mass, length, amount of substance.
5. Time
6. Application of base SI units.
7. Equations for properties. **Progression Task - Mass and amount of substance**
8. Energy
9. Force and motion
10. Mass
11. Electrical
12. Area and volume **Progression Task - force and motion**
13. Exam style end of unit assessment
14. **Progression task – feedback from EoUT**

**Synoptic Project- Bird Box**

1. Intro to project
2. Material research
3. Production planning/ risk assessment
4. Isometric drawing
5. 3<sup>rd</sup> Angle Projection Drawing
6. Manufacturing – marking out
7. Manufacturing – base
8. Manufacturing – sides
9. Manufacturing – front and back
10. Manufacturing – roof
11. Manufacturing – finishing
12. Assembly
13. Test / evaluate

**Assessment:**

Teacher assessment theory – exam style marking for end of unit tests.

Teacher assessment – Synoptic

AO1 Recall knowledge and show understanding

AO2 Apply knowledge and understanding

AO3 Analyse and evaluate knowledge and understanding

AO4 Demonstrate and apply technical skills and processes

AO5 Manage and evaluate the project

**Summer**

**Theory – properties of materials, tools and machinery.**

1. Properties of materials – chemical, electrical,
2. Properties of materials –mechanical, optical, thermal.
3. Characteristics – aesthetics **Progression Task – properties of materials**
4. Environmental impact
5. Sustainability, renewable materials, and carbon footprint.
6. Metals
7. Polymers **Progression Task – environmental impact**
8. Wood
9. Ceramics
10. Composites
11. Exam style end of unit assessment
12. **Progression task – feedback from EoUT**
13. Hand tools
14. Machinery

**Synoptic Project - Toolbox**

1. Intro to project
2. Material research
3. Production planning/ risk assessment
4. CAD drawing
5. CAD drawing – 3<sup>rd</sup> Angle
6. Manufacturing – marking out, manufacturing – base
7. Manufacturing – sides
8. Manufacturing – front and back
9. Manufacturing – tray
10. Manufacturing – lid and hinge
11. Manufacturing – finishing
12. Assembly
13. Test / evaluate

**Assessment:**

Teacher assessment theory – exam style marking for end of unit tests.

Teacher assessment – Synoptic

AO1 Recall knowledge and show understanding

AO2 Apply knowledge and understanding

AO3 Analyse and evaluate knowledge and understanding

AO4 Demonstrate and apply technical skills and processes

AO5 Manage and evaluate the project

**Useful resources for supporting your child at home:**

Excellent design sketching tutorials:

[product designer maker - YouTube](#)

Student access to Focus eLearning – direct link given to students.

**Homework:**

Homework will be set fortnightly; students will have a digital Unit book which they will respond to research and questions online.