Synoptic connections

NCFE Level 1/2 Technical Award in Engineering
QN: 603/7006/3

Synoptic connections

Synoptic assessment requires learners to combine elements of their learning and show accumulated knowledge and understanding across the qualification content. It enables learners to evidence their capability to integrate and apply knowledge, understanding and skills gained with breadth and depth in context.

It is therefore essential when planning for teaching and throughout delivery that the interdependencies and links build across the content of the qualification and are highlighted and reinforced.

The qualification comprises 9 mandatory content areas. All content is mandatory and must be taught.

The teaching content does not have to be delivered in a linear way; content areas are interdependent in knowledge, skills and concepts.

Teachers may take a synoptic approach across the qualification. This will enable learners to be able to apply theories and concepts from across the qualification specification in context to skills-based situations. Through combining content and developing holistic connections, learners will be able to demonstrate and evidence their full knowledge and understanding of the subject area and the engineering industry.

Learners will have the opportunity to identify relevant study skills and reflect upon their preferred learning style throughout the qualification.

Content area 1: Engineering disciplines

Content area 1.1: Engineering disciplines through projects and products

The content of area 1.1 engineering disciplines through projects and products helps support learners to understand that engineers specialise in one area to be able to solve modern world problems. To be able to develop these projects and products engineers are required to have an in-depth knowledge of a particular area to be able to create a successful outcome for its users.

Content areas that link synoptically to content area 1.1 engineering disciplines through projects and products:

1. Engineering disciplines:
   - 1.2 The health and safety legislation governing engineering

2. Applied science and mathematics in engineering:
   - 2.1 Application of SI units of measurement
   - 2.2 Equations used to calculate energy, force, motion, electrical and geometric shapes

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment, and machines

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques

Content area 1.2: The health and safety legislation governing engineering

The content of area 1.2 the health and safety legislation governing engineering helps support learners to understand that health and safety must be managed across all engineering disciplines. It is a legal framework which companies must follow and report to in relation to keeping employers, employees, site visitors and the general public safe. Learners will also understand the legal framework put in place to ensure these safety standards are followed and maintained.

Content areas that link synoptically to content area 1.2 the health and safety legislation governing engineering:

1. Engineering disciplines:
   - Engineering disciplines through projects and products

5. Engineering tools, equipment, and machines:
   - 5.1 Tools, equipment and machines

8. Production planning techniques:
   - 8.1 Production planning

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques
   - 9.2 Safe and correct use of tools, equipment and machines

Content area 2: Applied science and mathematics in engineering

Content area 2.1: Application of SI units of measurement

The content of area 2.1 application of SI units of measurement helps support learners to understand how to apply scientific units used within engineering projects and product development. Learners will investigate a range of SI units and be able to identify which ones would be most suitable for different engineering applications.

Content areas that link synoptically to content area 2.1 application of SI units of measurement:

1. Engineering disciplines:
   - 1.1 Engineering disciplines through projects and products

2. Applied science and mathematics in engineering:
   - 2.2 Equations used to calculate energy, force, motion, electrical and geometric shapes

3. Reading engineering drawings:
   - 3.1 Reading engineering drawings

4. Properties, characteristics and selection of engineering materials:
   - 4.1 Properties

6. Hand-drawn engineering drawings:
   - 6.1 Hand-drawn engineering drawings

7. Computer-aided design (CAD) engineering drawings:
   - 7.1 CAD engineering drawings

8. Production planning techniques:
   - 8.1 Production planning

9. Applied processing skills and techniques:
   - 9.1 skills and techniques

Content area 2.2: Equations used to calculate energy, force, motion, electrical and geometric shapes

The content of area 2.2 equations used to calculate energy, force, motion, electrical and geometric shapes helps support learners to understand how to apply scientific equations when developing engineering projects and products. Learners will investigate a range of SI equations and be able to identify where they would be applied within different engineering applications.

Content areas that link synoptically to content area 2.2 equations used to calculate energy, force, motion, electrical and geometric shapes:

1. Engineering disciplines:
   - 1.1 Engineering disciplines through projects and products

2. Applied science and mathematics in engineering:
   - 2.1 Application of SI units of measurement

7. Computer-aided design (CAD) engineering drawings:
   - 7.1 CAD engineering drawings

8. Production planning techniques:
   - 8.1 Production planning

Content area 3: Reading engineering drawings

Content area 3.1: Reading engineering drawings

The content of area 3.1 reading engineering drawings helps support learners to understand BS8888 for 2- and 3-dimensional engineering drawings. Learners will understand the different elements of these drawing conventions and how they ensure that products and projects are manufactured to an accurate standard.

Content areas that link synoptically to content area 3.1 reading engineering drawings:

1. Engineering disciplines:
   - 1.1 Engineering disciplines through projects and products

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment, and machines
   - 5.2 Safe and correct use

6. Hand-drawn engineering drawings:
   - 6.1 Hand-drawn engineering drawings

7. Computer-aided design (CAD) engineering drawings:
   - 7.1 CAD engineering drawings

8. Production planning techniques:
   - 8.1 Production planning

Content area 4: Properties, characteristics and selection of engineering materials

Content area 4.1: Properties and characteristics of materials

The content of area 4.1 properties and characteristics of materials helps support learners to understand that materials which could be selected for use within engineering products and projects will exhibit a diverse range of properties and characteristics. Learners will understand that that these different properties and characteristics can be effectively harnessed to create successful engineering products and projects.

Content areas that link synoptically to content area 4.1 properties and characteristics of materials:

1. Engineering disciplines:
   - 1.1 Engineering disciplines through projects and products

2. Applied science and mathematics in engineering:
   - 2.1 Application of SI units of measurement
   - 2.2 Equations used to calculate energy, force, motion, electrical and geometric shapes

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques

Content area 5: Engineering tools, equipment and machines

Content area 5.1: Tools, equipment and machines

The content of area 5.1: tools, equipment and machines helps support learners to understand the correct use of common tools, equipment and machines used within the engineering industry. Learners will understand how to use tools, equipment and machines to mark out, cut, modify, join and finish materials in the correct manner.

Content areas that link synoptically to content area 5.1 tools, equipment and machines:

1. Engineering disciplines:
   - 1.1 Engineering disciplines through projects and products
   - 1.2 The health and safety legislation governing engineering

2. Applied science and mathematics in engineering:
   - 2.1 Application of SI units or measurement

4. Properties and characteristics of materials:
   - 4.1 Properties and characteristics of materials

5. Engineering tools, equipment and machines:
   - 5.2 Safe and correct use

8. Production planning techniques:
   - 8.1 Production planning

9. Applied processing skills and techniques:
   - 9.1 skills and techniques
   - 9.2 Safe and correct use of tools, equipment and machines

Content area 6: Hand-drawn engineering drawings

Content area 6.1: Hand-drawn engineering drawings

The content of area 6.1 hand-drawn engineering drawings helps support learners to understand how to produce hand-drawn engineering drawings. Learners will learn to apply specific drawing conventions conforming to BS8888 and use layouts recognised within industry to produce engineering drawings.

Content areas that link synoptically to content area 6.1 hand-drawn engineering drawings:

3. Reading Engineering drawings:
   - 3.1 Reading engineering drawings

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment and machines
   - 5.2 Safe and correct use

8. Production planning techniques:
   - 8.1 Production planning

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques
   - 9.2 Safe and correct use of tools, equipment and machines

7: Computer-aided design (CAD) engineering drawings
Content area 7.1: Computer-aided design (CAD) engineering drawings The content of area 7.1 CAD engineering drawings helps support learners to understand how to produce CAD drawn engineering drawings. Learners will learn to apply specific drawing conventions conforming to BS8888 and use layouts recognised within industry to produce engineering drawings. Content areas that link synoptically to content area 7.1 CAD engineering drawings: 3. Reading engineering drawings: • 3.1 Reading engineering drawings 5. Engineering tools, equipment and machines: • 5.1 Tools, equipment and machines • 5.2 Safe and correct use 8. Production planning techniques: • 8.1 Production planning 9. Applied processing skills and techniques: • 9.1 Skills and techniques • 9.2 Safe and correct use of tools, equipment and machines

Content area 8: Production planning techniques

Content area 8.1: Production planning

The content of area 8.1 production planning helps support learners to successfully and safely produce the required end product, using suitable materials and techniques. Learners will be able to identify and explain how to manage risks and work in a safe manner. Within a production plan, learners will identify the most suitable tools and equipment to complete the manufacturing task and identify what quality control check would be put in place to ensure a high-quality outcome.

Content areas that link synoptically to content area 8.1 production planning:

3. Reading engineering drawings:
   - 3.1 Reading engineering drawings

4. Properties, characteristics and selection of engineering materials:
   - 4.1 Properties and characters of materials

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment and machines
   - 5.2 Safe and correct use

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques
   - 9.2 Safe and correct use of tools, equipment and machines

Content area 9: Applied processing skills and techniques

Content area 9.1: Skills and techniques

The content of area 9.1 skills and techniques helps support learners to understand a range of processing skills and manufacturing techniques. Learners will understand how to prepare, modify and join different materials to be able to produce a manufacturing task accurately and in a safe manner. An understanding of appropriate finishing techniques for different materials is also required.

Content areas that link synoptically to content area 9.1 skills and techniques:

1. Engineering disciplines:
   - 1.2 The health and safety legislation governing engineering

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment and machines
   - 5.2 Safe and correct use

6. Hand-drawn engineering drawings:
   - 6.1 Hand-drawn engineering drawings

7. Computer-aided design (CAD) engineering drawings:
   - 7.1 CAD engineering drawings

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques
   - 9.2 Safe and correct use of tools, equipment and machines

Content area 9.2: Safe and correct use of tools, equipment and machines

The content of area 9.2 safe and correct use of tools, equipment and machines helps support learners to understand how to maintain a range of common tools, equipment and machines. Learners will understand what control measures are in place to keep them safe while operating this equipment during a manufacturing task.

Content areas that link synoptically to content area 9.2 safe and correct use of tools, equipment and machines:

5. Engineering tools, equipment and machines:
   - 5.1 Tools, equipment and machines
   - 5.2 Safe and correct use

6. Hand-drawn engineering drawings:
   - 6.1 Hand-drawn engineering drawings

7. Computer-aided design (CAD) engineering drawings:
   - 7.1 CAD engineering drawings

9. Applied processing skills and techniques:
   - 9.1 Skills and techniques

9.2 Safe and correct use of tools, equipment and machines