March 2021

Information on critical competences for holistic assessment

Group award title: NC in Mechanical Maintenance Engineering (at SCQF level 5)

Group award code: G983 45

https://www.sqa.org.uk/sqa/files_ccc/NQGA-Engineering-levels-5-and-6.pdf

Group award aim (specific)

- Provide awards that will allow candidates to work now, or in the future, at craft or technician levels in an engineering environment.
- Provide awards that create a route towards meeting the academic requirements for Engineering Technician status.
- Provide awards that on successful completion will allow candidates to progress to an HNC or HND or degree in an engineering or related subject discipline.
- Allow candidates to develop knowledge, understanding and skills in Communication, Numeracy and Information and Communication Technology that underpin and support their studies in engineering.
- Allow candidates to develop knowledge, understanding and skills in an area of engineering which relates directly to the title of the award the candidate is studying.
- Allow candidates a degree of specialisation in engineering relevant to the area of engineering covered by the award.
- On successful completion of an award allow candidates to achieve Core Skills in Communication, Numeracy and Information and Communication Technology. Furthermore to provide candidates with opportunities to develop the Problem Solving and Working with Others Core Skills.
- Allow candidates to develop knowledge, understanding and skills in core practical and theoretical aspects of mechanical plant maintenance including Health and Safety at SCQF level 5.
- Allow candidates to specialise further in the practical and theoretical aspects of mechanical plant maintenance at SCQF level 5. Candidates may also take a further unit in Mathematics (as one of their 4 optional units) if they wish to specialise further in this subject.

Key critical competences and units

Critical competences are shown **in bold**.

F3HV 11 Mathematics Craft 1

This unit is intended primarily for those candidates who wish to develop their knowledge and understanding of Mathematics at SCQF level 5 with a view to supporting and underpinning their studies in an engineering discipline. In such cases, delivery of the unit should be set within the context of the award to which it contributes. The unit is designed to develop aspects of the candidate's skills in **numeracy, geometry, graphical communication, trigonometry and algebra,**. It is envisaged that the content of each Outcome is delivered and assessed with specific reference to the candidate's engineering specialism, where appropriate.

F5D6 11 Engineering: Using Information Technology

This unit is designed to introduce routine features of **word processing, spreadsheets** and a relevant **software package appropriate to an engineering environment.** The candidate will gain practical experience in the use of routine features in these types of software, and in using **internet search techniques**. The unit will also provide candidates with information regarding the selection of appropriate software for specific tasks.

F5K1 11 Mechanical Engineering Principles

This mainly theory based unit is designed to provide candidates with basic knowledge and understanding of mechanical engineering principles. During the delivery of this unit candidates will learn about the basic quantities used in mechanical engineering systems and how to solve simple problems involving such systems. They will also develop the knowledge and understanding to solve mechanical engineering problems involving **work, energy, conservation of energy and power**. Candidates will also learn about terms used in **simple mechanical machines** and how to solve problems associated with such machines. They will also develop the knowledge and understanding to state terms and solve **problems involving heat**.

F5HH 11 Electrical Plant Safety and Maintenance

This unit has been designed to introduce candidates to electrical plant safety, maintenance requirements and precautions that should be taken when working on electrical plant and equipment. Candidates will also study the various factors involved in the **maintenance of electrical equipment** as well as the relative benefits of various maintenance methods and regimes. In addition, they will perform **routine maintenance and fault diagnosis** on an item of electrical equipment. This unit is suitable for those candidates who wish to learn about basic electrical plant safety and maintenance. Such candidates may be currently employed or seeking employment as electrical, mechanical or marine craft persons or technicians.

F5J4 11 Maintenance Safety

This introductory unit is designed to provide candidates with a basic knowledge and understanding of health and safety in an engineering maintenance environment. During unit delivery candidates will learn about the **responsibilities of employers and employees in relation to current health and safety legislation** as applied in a mechanical plant maintenance environment. They will also identify procedures for reporting potential **health and safety hazards**. Candidates will also learn to state important safety requirements

involved in working safely in a plant maintenance environment. They will also develop the knowledge and understanding to describe the ways in which **health and safety procedures** are applied to reduce risks associated with plant maintenance tasks.

F5J2 11 Plant Installation

This unit has been designed to provide candidates with the opportunity to develop basic knowledge, understanding and skills in mechanical plant installation thus enabling them to contribute to plant installation in a safe and logical manner. During delivery of the unit candidates will learn how to **extract plant installation information** from appropriate sources. They will also develop the knowledge and skills to **install mechanical plant** using approved lifting and handling equipment and techniques. Candidates will learn to **level, align and secure plant** using correct tools and equipment. They will also learn to **test plant after installation** and complete appropriate **test documentation**.

F5J3 11 Plant Maintenance Practice

This largely practical unit is designed to provide candidates with a basic knowledge, understanding and skills in mechanical plant maintenance. During delivery of the unit candidates will be introduced to different types of **maintenance strategies and documentation**. They will learn to carry out the necessary tasks prior to undertaking maintenance on items of equipment removed from an engineering system. Candidates will **carry out given maintenance tasks on items of equipment**. On completion of maintenance tasks and reassembly of equipment candidates will **perform basic functional checks** on the equipment and **complete relevant maintenance documentation**. Candidates will learn to **apply safe working procedures** and practices throughout the delivery of the unit.

F5K2 11 Pneumatics and Hydraulics

This largely practical unit is designed to provide candidates with basic knowledge, understanding and skills of pneumatic and hydraulic circuits. During delivery of the unit candidates will learn how to **interpret pneumatic and hydraulic components and component symbols**. They will develop the knowledge and skills to **draw and simulate pneumatic and hydraulic circuits**. Candidates will learn how to **assemble and test pneumatic or hydraulic circuits** and they will also develop the knowledge and skills to **perform basic fault finding techniques on pneumatic or hydraulic circuits and rectify faults**. Candidates will develop practical skills and safe working practices whilst assembling and testing pneumatic or hydraulic systems.

F5K3 11 Power Drives

The unit is designed to allow candidates to develop basic knowledge, understanding and skills of mechanical power transmission drives. During delivery of the unit candidates will learn to **identify power transmission** drives and explain their essential features. They will also learn how to **select power transmission products** from manufacturers' data to match given technical requirements. Candidates will also develop the knowledge and skills to **fit, align and adjust mechanical power transmission drives safely**. They will also develop knowledge and understanding of methods used to **lubricate mechanical power transmission drives** and how ingression of contaminants can be prevented.

F5FP 11 Graphical Engineering Communication

This largely practical unit is designed to provide candidates with basic knowledge, understanding and skills in graphical engineering communication. During delivery of the unit candidates will learn to **create drawings of engineering components** using **isometric projection**. They will also develop the knowledge and understanding to **extract and interpret information from engineering drawings.** Candidates will also develop the knowledge, understanding and skills to create detailed**, two dimensional engineering drawings** in both **First and Third Angle Projections**.

Key critical evidence

Candidates may have completed some units and have other units that are partially complete or incomplete.

It is anticipated that the majority of candidate evidence will be gathered by traditional or online methods (such as simulation and online testing), as well as through completed practical work.

Some units require evidence of practical activity, which may be difficult to gather under the current circumstances. It may be the case that alternative evidence can be used from other units. However, any evidence gathered must be appropriate to the level of the unit and the award.

If you have any questions, please contact qualifications.development@sqa.org.uk.