

SQA Advanced Unit Specification

General information for centres

Unit title: Supply Chain: Capacity Planning and Production Operations

Unit code: HP5M 47

Superclass: VB

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Version: 01

Unit purpose

This specialist Unit is designed to enable learners to demonstrate that they can determine the capacity required for given work centres based on the manufacturing orders output from the Material Requirements Planning (MRP) system, and to be able to schedule these orders in such a way that they meet the customer requirements in terms of delivery.

It is primarily intended for learners who aspire to take up a management position in a manufacturing environment. It would also be appropriate for those involved in the various functions associated with manufacturing, inventory, stores, production and distribution planning, demand management and purchasing.

Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Determine and manage the capacity of work centres based on manufacturing orders.
- 2 Schedule, prioritise and manage individual works' orders to meet customer requirements.
- 3 Explain the features of process design and how they meet the performance objectives of the production operations.

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Credit points and level

1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended entry to the Unit

Access to this Unit is at the discretion of the centre. However, learners are expected to have work experience relevant to the activities of the supply chain. It is not necessary that learners hold a team leader, supervisory or management position.

Learners are also expected to have competency in numeracy and communication skills to at least SCQF level 5. This may be evidenced by possession of the Core Skills Units in *Numeracy* and *Communication* or similar qualifications or experience.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

Unit specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Determine and manage the capacity of work centres based on manufacturing orders.

Knowledge and/or Skills

- ◆ Material Requirements Planning (MRP) system
- ◆ Work centre data
- ◆ Work load
- ◆ Comparison of load and capacity
- ◆ Capacity profiles
- ◆ Adjust capacity to accommodate the load requirements

Evidence Requirements

Learners will need evidence to demonstrate all aspects of their Knowledge and/or Skills in this Outcome by showing that they can:

- ◆ use the work order data from the Material Requirements Planning (MRP) system to determine the load for **three** work centres
- ◆ use the information from the Capacity Planning system and the work centre data to determine a load for each work centre
- ◆ compare the load on each work centre with the capacity available
- ◆ calculate a capacity profile for each work centre
- ◆ explain how capacity can be adjusted to accommodate the load

Outcome 2

Schedule, prioritise and manage individual works' orders to meet customer requirements.

Knowledge and/or Skills

- ◆ Priority management approaches
- ◆ Prioritising and sequencing rules
- ◆ Load levelling
- ◆ Forward and backward scheduling
- ◆ Finite and infinite scheduling
- ◆ Push/pull systems

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Evidence Requirements

Learners will need evidence to demonstrate all aspects of their Knowledge and/or Skills in this Outcome by showing that they can:

- ◆ explain how the organisation may decide a policy on priority management
- ◆ prioritise and sequence customer orders based on the organisation's policy
- ◆ assess the loading to achieve a level load where possible
- ◆ conduct both forward and backward scheduling activities
- ◆ explain the concepts of finite and infinite scheduling
- ◆ compare the use of a pull system with the more established push system of shop floor loading

Outcome 3

Explain the features of process design and how they meet the performance objectives of the production operations.

Knowledge and/or Skills

- ◆ Shop floor layout
- ◆ Data collection
- ◆ Group/cell technology
- ◆ Input/output control
- ◆ Traceability
- ◆ Total productive maintenance

Evidence Requirements

Learners will need evidence to demonstrate all aspects of their Knowledge and/or Skills in this Outcome by showing that they can:

- ◆ describe the principles of shop floor layout
- ◆ examine **two** different data collection methods on the shop floor
- ◆ explain the principles of group and cell technology
- ◆ explain the use of input/output control
- ◆ discuss the requirement for traceability
- ◆ outline the advantages and disadvantages of total productive maintenance

Unit specification: support notes

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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is likely to form part of an SQA Advanced Supply Chain Management Group Award. It is designed to enable learners to understand the importance of capacity planning, prioritisation and scheduling of work and the layout of the production facilities to ensure efficient throughput of work to meet the customers' requirements.

The Unit will also enable learners to apply a number of recording and improvement techniques for all three major areas in the Unit.

It is recommended that the learner should have experience of working in a supply chain or associated function.

There may be opportunities for learners who successfully achieve this Unit to gain exemptions from a number of professional bodies. Learners should contact the relevant professional bodies to ascertain their current exemption policies.

Outcome 1 involves the process of determining and managing the capacity of various work centres based on manufacturing orders.

- ◆ use work order data from the Material Requirements Planning (MRP) system
- ◆ elements of work centre data
- ◆ determine work centre loads
- ◆ compare the load with the capacity at work centres
- ◆ build a capacity profile
- ◆ proposals on how capacity can be adjusted to accommodate the load

Outcome 2 involves a more in-depth capacity problem and will examine the scheduling, prioritising and management of individual works' orders based on customer requirements.

- ◆ organisational policy on priority management
- ◆ prioritising and sequencing customers' orders based on the organisation's policy
- ◆ assessing the load to achieve a level load where possible
- ◆ using forward and backward scheduling techniques
- ◆ the concepts of finite and infinite scheduling
- ◆ evaluation of 'Push' and 'Pull' systems for shop floor loading

Outcome 3 covers the process design to ensure it meets the performance objectives of the production operations.

- ◆ principles of shop floor layout
- ◆ shop floor data collection methods
- ◆ group and cell technology

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- ◆ input/output control
- ◆ traceability
- ◆ advantages and disadvantages of total productive maintenance

Guidance on approaches to delivery of this Unit

Where this Unit forms part of a Group Award in Supply Chain Management, it can be delivered at any time in the programme but it must be delivered in the order of the Outcomes as it is a progressive Unit.

It is anticipated that this Unit may be delivered to a variety of learner groups and, wherever possible, teaching and research should be slanted towards their individual needs. The latest materials and examples from current and business practice should be used to highlight and illustrate the differences between organisations.

In addition to the classroom explanations and discussions that this Unit provides, learners should be encouraged to make use of relevant websites to gather information for themselves. Direction may be required on the location of useful information sources; however learners should be encouraged to use their initiative to discover the other various sources of information available.

Industrial visits, or preferably work placements, should be organised and guest speakers should be invited to speak to learners, especially where the learners do not have industrial experience.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

To achieve this Unit the learners must produce satisfactory assessment evidence that shows they have achieved all of the Unit Outcomes. The evidence must cover **all** the Evidence Requirements stated in the Unit specification.

Assessment guidelines

Outcome 1

The assessment of this Outcome could take the form of a case study. The case study could be based on a product, which has three components that are processed over three work centres and will require learners to calculate the loading on the work centres and compare this with available capacity.

The case study response should be supported by the learner's explanation of any actions they would recommend to overcome any shortfall in the normal capacity available. Alternatives could be discussed and reasons given for the recommended action.

This type of assessment task should be designed to enable learners to complete it in 2 hours 30 minutes.

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The same case study information may be used for Outcome 2.

Outcome 2

The assessment for this Outcome may be split into two parts. The first part could be based on the same case study used in Outcome 1, with learners identifying capacity problems which will enable them to set priorities for jobs based on the organisation's policies and customer information.

The second part of the assessment could be a report covering the organisation's prioritising policy, the findings of the case study and an examination of an alternative shop floor loading using a pull system. It is recommended that the report be approximately 500–600 words in length.

Outcome 3

This Outcome could be assessed by a report. Learners could explain how the features of process design affect the performance objectives of the production operations. When evidence is submitted as a written report it is recommended it be approximately 1,000–1,200 words in length.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

There are no Core Skills embedded in this Unit. However, there are opportunities for developing the Written Communication component of the Core Skill of *Communication* at SCQF level 5; the Core Skill of *Numeracy* at SCQF level 5 and the Critical Thinking and Planning and Organising components of the Core Skill of *Problem Solving* at SCQF level 6 in this Unit.

Communication — Written Communication at SCQF level 5

All three Outcomes provide learners with the opportunity to develop their written communication skills.

Opportunities will occur where learners present written responses as part of their work throughout the Unit, but especially in the assessment which may be a written project with Outcomes 1 and 2 being based on a specific case study. Learners will, therefore have to analyse information and organise the content of their report/responses into a logical and effective structure.

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Numeracy — Using Number at SCQF level 5

In Outcomes 1 and 2 learners are expected to calculate work centre load and capacity based on a case study. Learners will carry out similar calculations during the delivery of the Unit. Learners will apply a range of numerical skills in everyday situations.

Numeracy — Using Graphical Information at SCQF level 5

In Outcomes 1 and 2 learners will have the opportunity to develop their graphical skills by presenting the figures calculated in tabular form to aid comparison between the load and capacity of the work centres.

Problem Solving — Critical Thinking at SCQF level 6

In Outcome 2 learners have to determine the most effective way of overcoming a mismatch between load and capacity; and in Outcome 3 further critical thinking skills will be required in that they will have to be able to prioritise customers' needs. Learners are, therefore, having to identify factors involved in a situation, analyse the relevance of these factors and develop and justify an approach to deal with a situation.

Problem Solving — Planning and Organising at SCQF level 6

In Outcomes 1 and 2 learners will need to plan the most effective loading for the work centre they found to be critical and re-plan the capacity and load. Learners are planning, organising and completing a complex task.

Administrative information

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our [Centre Feedback Form](#).

General information for learners

Unit title: Supply Chain: Capacity Planning and Production Operations

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit introduces you to capacity planning and its relationship to prioritising and scheduling, along with the importance of production operations.

You will be able to demonstrate the importance of the process design to ensure that it meets the requirements based on the type of product to be produced.

Outcome 1 looks at various data from Materials Requirement Planning (MRP) and work centres, and the correct use of this data will allow you to determine and manage the capacity of various work centres based on the manufacturing orders. This may be achieved by building up a work load for each work centre and comparing this load to the capacity available at each work centre. In turn, this will allow you to build a capacity profile which will highlight the situation where load will exceed capacity. You will then describe ways in which the capacity can be adjusted in order to accommodate the load.

Outcome 2 takes the processes, encountered in Outcome 1, a bit further by encountering a load/capacity mismatch that will not be able to be overcome using the methods of adjusting capacity described in Outcome 1. This will require you to make other decisions which will involve the use of prioritisation and sequencing and looking at different aspects of scheduling. You will compare the use of a 'pull system' to the more established 'push system'.

Outcome 3 focuses on the importance of process design in order to meet the performance objectives of the production operations, and you will examine the principles of shop floor layout, how data is collected from the shop floor to ensure that the process is working as planned. You will be introduced to the principles of Group and Cell technology again as a means of meeting the performance objectives and the use of Input/Output control. Traceability is sometimes essential for some products and this will be covered in this Outcome and also the advantages and disadvantages of total production maintenance in terms of meeting performance objectives.

This Unit could be assessed in a variety of ways. Outcomes 1 and 2 may be assessed by a case study. The assessment of Outcome 2 may also involve a report on the findings of the case study. Outcome 3 may be assessed by a report.

If you achieve this Unit there may be opportunities for you to gain exemption from a number of professional bodies. It will be your responsibility to ascertain from the professional body what is included in their current exemption policies.