

Unit 9: Commercial Aspects of Engineering Organisations

Unit code:	D/600/0259
QCF Level 3:	BTEC National
Credit value:	10
Guided learning hours:	60

● Aim and purpose

This unit aims to give learners knowledge of engineering planning, competitive commercial activities and the constraints placed upon engineering organisation.

● Unit introduction

Engineers are employed in a range of organisations where their knowledge and skills are used to solve business needs and contribute to commercial success.

The organisations that employ engineers need to understand the areas in which their engineering expertise is deployed. This knowledge can help them plan their business effectively to secure competitive advantage. Engineering organisations also need to conduct themselves in a professional way and need to have a strong customer focus. Protecting what they do, invent, make or service is equally important for longer-term advantage and survival.

Companies need to operate their commercial activities in a competitive yet legal way. With infrastructure and engineering products and processes becoming increasingly complex, engineers need to integrate consideration of the environmental and social impacts with mainstream and commercial aspects of their work. It is therefore also important that organisations are able to deal with both local and national constraints and can demonstrate their commitment in these areas such as the gaining and use of kitemark systems.

This unit aims to place learners' studies in the context of engineering business planning, competitive commercial activities and the constraints placed upon engineering related organisations. It involves developing an understanding of the areas in which specific businesses operate. The unit will also place the considerations of business planning and corporate expectations into a realistic context.

Any commercial process must generate sufficient income to sustain its operation. The income depends both on customer demand and on whether the products or services provided are able to make a profit or remain within budget. This unit will examine the commercial activities carried out by engineering organisations and the constraints that are placed on them inside a quality framework.

● Learning outcomes

On completion of this unit a learner should:

- 1 Know about the business planning and corporate expectations of an engineering organisation
- 2 Know about competitive commercial activities
- 3 Know about local and national constraints
- 4 Know about the concepts of quality assurance and quality control.

Unit content

1 Know about the business planning and corporate expectations of an engineering organisation

Business planning considerations: methods of securing and managing resources, methods of recruiting and managing staff; financial; managing suppliers (supply chain management) and other interested stakeholders; influence of marketing and sales activities; building relationships with clients; aiming to establish competitiveness

Corporate expectation and customer focus: product or service range; customer considerations eg expectations, corporate image, reputation, effects on success; defined procedures; employer expectations eg rapport, positive attitudes, body language, dress code, clear communications, respect for individual differences and choices; ethical expectations eg accuracy and reliability of information used, honesty and integrity, respect for life, law and public good, responsible leadership, listening and informing

2 Know about competitive commercial activities

Tendering and contracting: terms (expressed, implied); warranties and conditions; implications of non-performance; documents eg estimates, quotations, contracts; promotion of equality and diversity

Intellectual rights: definition and purpose; intellectual property legislation and acts eg UK, international, Patents Act 1977, Copyright, Designs and Patents Act 1988 (Parts V and VI), Patents Act 1949 (not consolidated), Patents Rules 1995; processes eg patenting, design registration, trademarking

Innovation: purpose and effects eg innovation and competitive advantage, market competition, fashion; techniques eg systematic thinking, leadership, organisational behaviour, synergy between research and development (R&D) and product development, brainstorming; possible implementation strategies eg technology brokers, outsourcing expertise, partners

3 Know about local and national constraints

Local impact: provision of employment eg employment levels, workforce skill levels, training requirements, local skills councils, impact of outsourcing; effects on the community eg emissions, access and egress of people and materials

Statutory controls: employment protection; equal opportunities; health and safety; environmental controls eg sustainability, environmental impact, use of renewable resources

Public issues: public concerns; public opinion and changes that have occurred; industry attempts to influence opinion; impact upon employment

Kitemark systems: eg codes of practice (industrial, professional, organisational), ISO9000, ISO14001, Investors in People (IiP), The Learning Organisation

4 Know about the concepts of quality assurance and quality control

Quality: definitions eg fitness for purpose, compliance with standards, satisfying customer needs and expectations with regard to costs, performance, appeal, reliability, durability, maintenance, safety and customer care

Quality assurance: quality assurance as a company-wide philosophy; total quality management; quality standards and accreditation

Quality control: methods eg inspection, sampling, testing, condition monitoring, planned maintenance; 'right first time' philosophy

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 describe what should be considered when carrying out business planning	M1 explain the importance of successful tendering, contracting and innovation to business planning for an engineering organisation	D1 evaluate the effects that local and national constraints have on competitive commercial activities.
P2 describe the corporate expectations of an engineering organisation with a customer focus	M2 explain how the concepts of quality assurance and quality control affect the application of business planning considerations and corporate expectations.	
P3 describe how an engineering organisation carries out tendering and contracting		
P4 describe the intellectual rights an engineering organisation should consider when operating in a competitive environment		
P5 describe how innovation can be used as a competitive commercial activity by an engineering organisation		
P6 describe potential local impact, statutory controls and public issues that may affect the operation of a given engineering organisation [IE3]		
P7 describe the kitemark systems found in a given engineering organisation		
P8 define the term 'quality' as applied to a product or service		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P9 distinguish between quality assurance and quality control.		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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Essential guidance for tutors

Delivery

Most of this unit involves a practical approach through the use of case study material or studying actual companies. Other areas of the unit rely on a good theoretical understanding of the different commercial aspects of engineering organisations.

This unit provides opportunities for learners to use particular industrial case material, especially when learning about business planning, tendering and contracting and dealing with local and national constraints. Learners might have relevant practical experience and can be more motivated if they study an area they are familiar with. Industrial visits will help underpin the breadth of commercial aspects covered.

Learners would benefit from knowing about the different sectors, engineering functions and organisational types from *Unit 7: Business Operations in Engineering* before they start to look at business plans and corporate expectations. They should also know about the general aspects of customer focus and areas such as ethical expectations. Knowing how an organisation protects its designs, inventions etc will help learners realise the importance of correct tendering and contracting when reaching agreements with other businesses. Learning about the constraints that affect the organisation, including environmental and sustainability issues in engineering is also important before business planning can be finalised.

When dealing with clients and customers the organisation should be clear about its strategies on quality. This may mean that some centres will choose to deliver business planning towards the end of the unit. However, it could be delivered purely through a case study approach concurrently with any other part of the unit content.

Throughout the delivery of this unit typical templates such as business plans, tenders, patents etc could be used as discussion documents. There are many examples of successful and unsuccessful entrepreneurs that could be researched and innovations that have either become market leaders or have failed. Learners could be asked to present their findings about one of these to the rest of the group. Examples of any local engineering activities that have caused public issues to be raised could give learners an insight into knowing about typical constraints.

Note that the use of 'eg' in the content is to give an indication and illustration of the breadth and depth of the area or topic. As such, not all content that follows an 'eg' needs to be taught or assessed.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
<p><i>Whole-class teaching:</i></p> <ul style="list-style-type: none">• introduction to unit content and learning outcomes• explain and discuss methods of securing and managing resources, staff and suppliers• explain financial considerations that need to be taken into account• explain and discuss influence of marketing, building relationships with clients. <p><i>Individual learner research:</i></p> <ul style="list-style-type: none">• investigate business planning considerations for an engineering organisation.
<p><i>Whole-class teaching:</i></p> <ul style="list-style-type: none">• explain and discuss customer considerations and employer expectations• explain and discuss ethical expectations within business.
Preparation for and completion of Assignment 1: Business Planning and Corporate Expectations (P1, P2, M1 and M2).
<p><i>Whole-class teaching:</i></p> <ul style="list-style-type: none">• explain tendering and contracting terms, warranties and conditions and the implications of non-performance• explain and discuss the different forms of documentation involved in tendering and contracting• discuss promotion of equality and diversity. <p><i>Individual learner research:</i></p> <ul style="list-style-type: none">• investigate tendering and contracting for a national engineering organisation.
<p><i>Whole-class teaching:</i></p> <ul style="list-style-type: none">• explain the purpose of intellectual property rights and examine the different intellectual property legislation that can apply both in the UK and abroad• explain and discuss processes for patenting, registration and trademarking. <p><i>Individual learner study:</i></p> <ul style="list-style-type: none">• researching processes involved in gaining trademarks, patents etc.
<p><i>Whole-class teaching:</i></p> <ul style="list-style-type: none">• explain the purpose and effects of innovation• explain and discuss the techniques used to produce innovative products and ideas• explain and discuss the different strategies that can be used to implement innovative ideas. <p><i>Individual learner research:</i></p> <ul style="list-style-type: none">• investigate an innovative engineering entrepreneur or engineering product and identify and discuss what contributed to their success or failure.
Preparation for and completion of Assignment 2: Competitive Commercial Activities in Engineering (P3, P4 and P5).

Topic and suggested assignments/activities and/assessment

Whole-class teaching:

- discuss the ways that engineering businesses can impact on the local community
- explain the statutory controls that an engineering business needs to work within
- explain and discuss the public issues that relate to and impact upon an engineering business
- explain the different codes of practice and kitemark systems that can apply to engineering businesses.

Group work:

- using case studies examine and discuss how an engineering business is affected by local and national constraints.

Preparation for and completion of **Assignment 3: Constraints Affecting Engineering Organisations** (P6, P7 and D1).

Whole-class teaching:

- explain the purpose and definitions of quality
- explain and discuss quality assurance as a company wide philosophy and the use of total quality management
- explain the different quality control methods that can be used within an engineering business and right first time philosophy.

Preparation for and completion of **Assignment 4: Concepts of Quality Assurance and Quality Control** (P8 and P9).

Feedback, unit evaluation and close.

Assessment

Evidence of achievement can be collected from case studies, assignments and projects which should enable learners to explore business planning, commercial activities, local and national constraints and quality issues.

To achieve a pass, learners must demonstrate knowledge and understanding of business planning and the corporate expectations of an organisation with a customer focus. Learners should describe the intellectual rights an engineering organisation should consider and explain how innovation can gain competitive advantage. They should also have knowledge of local and national constraints that an organisation works within and be able to differentiate between quality assurance and quality control.

The unit could be assessed using four assignments. It may be best to leave the criteria associated with business planning until the end and therefore the first assignment could address the criteria associated with learning outcome 2. Written tasks could be given to ask learners about tendering and contracting (P3), intellectual rights (P4) and innovation (P5). The requirement for P3 should include terms, documentation and promotion of equality and diversity. The task for P4 should ensure that learners have an opportunity to demonstrate what they know about the appropriate legislation, acts and processes associated with innovation, as well as defining and describing the purpose of intellectual rights. A written task targeting P5 could ask learners to explain how innovation can be used by an engineering organisation. In doing this learners will need to show how success is based on the use of techniques and deployment strategies and the effect innovation has on competition.

A second assignment could be a set of written tasks to address criteria P6, P7 and D1. The local impact should be based around the provision of employment and effects on the community, whereas statutory controls cover employment protection, equal opportunities and health and safety as well as environmental controls. A written task is again suitable to address D1.

A third assignment could be a stand-alone assignment involving written tasks for each of P8 and P9.

The final assignment could involve a series of written tasks to cover the remaining criteria, namely P1, P2, M1 and M2. It is only after learners have tackled tasks that relate to learning outcomes 2, 3 and 4 that they will be able to relate business planning considerations and corporate expectations to tendering, contracting, innovation, quality assurance and quality control.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1 and M2	Business Planning and Corporate Expectations	A written activity requiring learners to investigate business planning and the corporate expectations of an engineering organisation.	An assignment containing a series of written tasks in which learners relate business planning and corporate expectations to tendering, contracting, innovation and quality assurance and control.
P3, P4 and P5	Competitive Commercial Activities in Engineering	A written activity requiring learners to investigate tendering and contracting, intellectual rights and innovation in relation to an engineering organisation.	An assignment containing a series of three written tasks in which learners describe how tendering and contracting is carried out, the intellectual rights that relate to an engineering business and the ways that innovation can be used as a competitive tool.
P6, P7 and D1	Constraints Affecting Engineering Organisations	A written activity requiring learners to investigate the local and national constraints that can impact upon an engineering organisation.	An assignment containing a series of written tasks in which learners describe local impact and statutory controls and kitemark systems. Learners will also produce a written evaluation of the effects of constraints on commercial activities.
P8 and P9	Concepts of Quality Assurance and Quality Control	A written activity requiring learners to investigate quality in relation to engineering commercial organisations.	An assignment containing two written tasks in which learners define quality and describe the differences between quality assurance and quality control.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Engineering sector suite. This unit has particular links with the following unit titles in the Engineering suite:

Level 1	Level 2	Level 3
		Unit 3: Engineering Project
		Unit 7: Business Operations in Engineering

Essential resources

Learners will need access to relevant intellectual property legislation. A range of information and data on engineering organisations as identified within the content and criteria is also needed for learning and assessment.

Employer engagement and vocational contexts

The use of vocational contexts is essential in the delivery and assessment of this unit. Much of the work can be set within the context of learners' work placements or be based upon case studies that relate to local industries.

There are a range of organisations that may be able help centres engage and involve local employers in the delivery of this unit, for example:

- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI, University of Warwick) – www.warwick.ac.uk/wie/cei/
- Learning and Skills Network – www.vocationallearning.org.uk
- Network for Science, Technology, Engineering and Maths Network Ambassadors Scheme – www.stemnet.org.uk
- National Education and Business Partnership Network – www.nebpn.org
- Local, regional Business links – www.businesslink.gov.uk
- Work-based learning guidance – www.aimhighersw.ac.uk/wbl.htm

Indicative reading for learners

Textbooks

Gibbs A – *Essentials of Patents* (Wiley and Sons, 2003) ISBN 0471250503

Grant J, Ashworth C and Charmasson H – *Patents, Registered Designs, Trademarks and Copyright for Dummies* (Wiley-Blackwell, 2008) ISBN 9780470519974

Marcosé I and Lines D – *Business Case Studies* (Longman, 2003) ISBN 0582406374

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	exploring the local impact, statutory controls and public issues that can affect an engineering organisation from the different perspectives of the engineering business and the local community.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	analysing, evaluating and judging the value of information relating to business planning, commercial activities, constraints and quality assurance and control
Reflective learners	setting goals with success criteria for their development and work
Team workers	collaborating with others during group work when investigating how engineering businesses are affected by local and national constraints.

● Functional Skills – Level 2

Skill	When learners are ...
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing and describing business planning, tendering and contracting and commercial activities in an engineering organisation
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching business planning, competitive commercial activities and local and national constraints that can affect engineering commercial organisations
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	describing business planning, tendering and contracting and commercial activities in an engineering organisation.