2016 Suite

OCR
Oxford Cambridge and RSA

Cambridge **TECHNICALS LEVEL 3**

Cambridge TECHNICALS 2016

ENGINEERING

Unit 20

Business for Engineering

D/506/7286

Guided learning hours: 60

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LEVEL 3

UNIT 20: BUSINESS FOR ENGINEERING

D/506/7286

Guided learning hours: 60

Essential resources required for this unit: none

This unit is internally assessed and externally moderated by OCR.

UNIT AIM

Whatever areas of engineering you look at, businesses which operate within them need to be commercially viable and constantly reviewing and developing what they do in order to survive in a globally competitive market place.

The aim of this unit is for learners to develop their understanding of how engineering businesses of all sizes survive, develop and manage the different constraints on their activities, through innovation, entrepreneurship and investment. Learners will learn about project management tools and develop an understanding of financial planning techniques and financial analysis in an engineering context.

TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

Please note – if learners are completing this unit as part of the Extended Diploma qualification they will be required to complete the synoptic unit 25: Promoting continuous improvement. Before your learners complete the assessment of this unit, you must refer to the specification and model assignment requirements for unit 25, so if applicable you can ensure learners gather the appropriate feedback on their own performance and performance of the system, process or artefact that they may have produced in this unit.

Learning Outcomes	Teaching Content
The Learner will:	**Learners must be taught:**
1. Know how size, ownership and key stakeholders can influence engineering businesses	1.1 sizes of engineering businesses, i.e. • local • national • international • global 1.2 ownership of engineering businesses, i.e. • types of ownership, i.e. o public limited companies (PLC), o private (sole trader, partnerships, private limited companies (ltd)) • the extent of liability for the different types of ownership 1.3 key stakeholders and how they influence different sizes and types of engineering businesses, i.e. • owners/managers/directors/ • employees • customers - internal (e.g. other departments/functional areas) and external (e.g. retailers, other manufacturers, general public) • suppliers • trade unions • government (e.g. health and safety regulations) • local/national/international communities

Learning outcomes	Teaching content
The Learner will:	**Learners must be taught:**
2. Understand strategies and techniques used to improve engineering businesses	2.1 how project management is used in engineering businesses, i.e. • monitoring the progress of projects • managing risks • contingency planning • benefits of project management 2.2 how resource management is used in engineering businesses i.e. • human resources to include: o leadership and management o staff levels to meet changing business needs and targets o staff training o monitoring team performance o staff morale and motivation • time (e.g. staff hours, production time, delivery deadlines) • utilities • space and location (e.g. storage, access) • production requirements (e.g. materials, equipment) • continuous improvement strategies and their benefits to engineering businesses (e.g. Just in Time, Kaizen) 2.3 the need for supply chain management in engineering to produce and deliver goods i.e. • supply strategies (e.g. quality against cost, local/distance, reliability) • availability of materials • supplier relationship management • inventory control • storage • costs • benefits
3. Understand external factors which affect engineering businesses	3.1 current legislation and regulation for engineering businesses, i.e. • legislation (e.g. Health & Safety at Work Act; The Employment Act; Equality Act; Factories Act; Data Protection Act; Companies Act; Copyright, Design and Patents Act) • regulation (e.g. COSHH; Manual Handling; Noise at Work; Working Time; Confined Spaces; Electricity at Work) • who they effect, who must comply and why they are in place 3.2 social and community considerations (e.g. involving community in policy-making decisions, corporate social responsibility, adapting behaviour to address business and external considerations, influence of stakeholders and conflicts of interest) 3.3 ethical considerations (e.g. use of labour, employment conditions, implementing or adapting ethical practices, local supply versus distant supply of materials) 3.4 environmental considerations (e.g. impact on local area, transport and logistics, energy usage and conservation, waste management) 3.5 how these external factors impact on competitiveness, brands and reputation of engineering businesses

Learning outcomes	Teaching content
The Learner will:	**Learners must be taught:**
4. Understand influences on innovation and entrepreneurship in engineering	4.1 development of new engineering products and services, i.e. • research and development, i.e. o identification of gaps in the current marketplace o identification of new product and service gaps o unique selling points o evaluating competitor products • the impact of new materials and technologies on product development decisions (e.g. SMART materials, rapid prototyping) • push-pull • planning for obsolescence • recoverable resources and materials 4.2 examples of successful modern innovation and entrepreneurship in engineering and the factors that contribute to their success (e.g. advances in technology, engineering processes and/or materials used; aspects of unique design) 4.3 protecting product development, designs and branding, i.e. • protecting copyright • intellectual property (IP) rights • patents • registered trademarks • intangible assets (e.g. reputation, trademarks) 4.4 impact of globalisation on engineering innovation and entrepreneurship (e.g. access to world markets, new supply lines)
5. Understand key financial terms and documents for engineering businesses	5.1 income statements (also known as a profit and loss account) to include: • turnover • gross profit • net profit 5.2 cash flow forecasts 5.3 statement of financial position (also known as a balance sheet) to include: • liabilities • assets (e.g. stock, machinery) 5.4 stock inventory and the rate of stock turnover • a budget • a break-even analysis • depreciation e.g. o straight line method o reducing balanced method 5.5 product costing to include: • fixed/overhead and variable costs • direct/indirect costs 5.6 cost of one unit of production

GRADING CRITERIA

LO	Pass	Merit	Distinction
	The assessment criteria are the Pass requirements for this unit.	To achieve a Merit the evidence must show that, in addition to the Pass criteria, the candidate is able to:	To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to:
1. Know how size, ownership and key stakeholders can influence engineering businesses	P1 Describe different engineering businesses in terms of size and type of ownership.	M1 Explain how stakeholder influence will vary between different engineering businesses.	
	P2 Describe different key stakeholders who influence engineering businesses.		
2. Understand strategies and techniques used to improve engineering businesses	P3 Explain how project management can be used in an engineering business.	M2 Explain the benefits of project, resource and supply chain management to an engineering business.	D1 Evaluate how continuous improvement strategies can be used by an engineering business to improve competitiveness.
	P4 Describe the resources and supply chain that need to be in place in order for an engineering business to manufacture and deliver products.		

LO	Pass	Merit	Distinction
3. Understand external factors which affect engineering businesses	P5 Explain how regulations and legislation can affect engineering businesses.	M3 Assess how external factors have impacted on the competitiveness, brands and reputation of an engineering business.	
	P6 Explain why social, ethical and environmental considerations might impact on engineering businesses.		
4. Understand influences on innovation and entrepreneurship in engineering	P7 Explain how new engineering products and services are developed.	M4 Explain the factors that have contributed to the success of a modern innovation or an example of entrepreneurship in engineering.	D2 Analyse the impact of globalisation on innovation and entrepreneurship in engineering.
	P8 Explain what engineering businesses can do to protect their product development, designs and branding.		
5. Understand key financial terms and documents for engineering businesses	P9 Explain what key financial terms mean.	M5 Complete a breakeven analysis and product costing for an engineering business.	D3 Create a budget for an engineering department or business.
	P10 Complete a stock inventory and calculate the rate of stock turnover for an engineering business.	M6 Calculate depreciation for a new item of equipment for an engineering business.	
	P11 Use knowledge of statistics and data to complete a statement of financial position for an engineering business. **Synoptic – Unit 1 Mathematics for engineering*		

*SYNOPTIC ASSESSMENT AND LINKS BETWEEN UNITS

When learners are taking an assessment task, or series of tasks, for this unit they will have opportunities to draw on relevant, appropriate knowledge, understanding and skills that they will have developed through other units. We've identified those opportunities in the grading criteria. Learners should be encouraged to consider for themselves which skills/knowledge/understanding are most relevant to apply where we have placed an asterisk.

ASSESSMENT GUIDANCE

LO1: Know how size, ownership and key stakeholders can influence engineering businesses
Learners should describe different engineering businesses in terms of size and type of ownership, and describe and explain stakeholder influence. Teachers might supply learners with suitable case study examples on which to base their investigations.

LO2: Understand strategies and techniques used to improve engineering businesses
Learners should be able to explain and analyse strategies and techniques used to improve engineering businesses. This should include project management and continuous improvement strategies. Teachers could again use case studies or real examples on which learners might base their investigations.

LO3: Understand external factors which affect engineering businesses
Learners should understand external factors such as legislation, regulation, social, ethical and environmental considerations that affect businesses. Learners might look at actual regulations and legislation, or use case studies on which to base their investigations.

LO4: Understand influences on innovation and entrepreneurship in engineering
Learners should explain and analyse the influence of innovation and entrepreneurship in engineering. Again, case studies of suitable products and services and how these have been influenced by innovation and entrepreneurship could be used as the basis for undertaking assessment.

LO5: Understand key financial terms and documents for engineering businesses
Learners should be able to demonstrate understanding of the key financial terms and documents for engineering businesses. Business accounts for real engineering businesses are readily available and might form the basis of demonstrating understanding of key terms. Learners should also be able to complete a stock inventory, calculate depreciation and create a budget for an engineering department or business. P11 provides an opportunity to draw upon and apply knowledge of statistics learnt in Unit 1.

Feedback to learners: you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it, and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced to inform their thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR Guide to Referencing available on our website: http://www.ocr.org.uk/i-want-to/skills-guides/.

MEANINGFUL EMPLOYER INVOLVEMENT - a requirement for the Foundation Diploma, Diploma and Extended Diploma (tech level) qualifications

The 'Diploma' qualifications have been designed to be recognised as Tech Levels in performance tables in England. It is a requirement of these qualifications for centres to secure for every learner employer involvement through delivery and/or assessment of these qualifications.

The minimum amount of employer involvement must relate to at least one or more of the elements of the mandatory content.

Eligible activities and suggestions/ideas that may help you in securing meaningful employer involvement for this unit are given in the table below.

Please refer to the *Qualification Handbook* for further information including a list of activities that are not considered to meet this requirement.

Meaningful employer engagement	Suggestion/ideas for centres when delivering this unit
1. Learners undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification.	• Work placements in engineering businesses; this could be an SME with the opportunity for learners to observe/ experience product/process development and or managing production of goods or services. • Learners are introduced to the production planning and control of engineering operations to appreciate the importance of each department or stage of the business operation.
2. Learners undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s).	• Centres can develop assignments in association with engineering organisations so that learners work on real-life projects set by industry that are mapped to the criteria of the unit • Engineering organisations set learners challenges where learners have to carry out planning of engineering production or a project for a new process/product/component, which involves multiple business stakeholders.

Meaningful employer engagement	Suggestion/ideas for centres when delivering this unit
3. Learners take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures.	• Production manager and/or Engineering manager delivers talks or seminars that explain how their products or services have changed, and the innovations that led to the changes. • New product introduction engineers deliver sessions that showcase the research and development for new products and services.
4. Industry practitioners operating as 'expert witnesses' that contribute to the assessment of a learner's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.	• Input from practicing Engineering/Production manager to ensure Health and Safety is considered when learners introduce new products and operational processes during project work and documentation • Assessment from practicing project engineers relating to the detailing of resource management requirements required to successfully introduce new products.

To find out more
ocr.org.uk/engineering
or call our Customer Contact Centre on **02476 851509**

Alternatively, you can email us on **vocational.qualifications@ocr.org.uk**

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