

Unit 35: Professional Engineering Management

Unit code	L/615/1503
Unit type	Core
Unit level	5
Credit value	30

Introduction

Engineers are professionals who can design, develop, manufacture, construct, operate and maintain the physical infrastructure and content of the world we live in. They do this by using their academic knowledge and practical experience, in a safe, effective and sustainable manner, even when faced with a high degree of technical complexity.

The aim of this unit is to continue building up on the knowledge gained in *Unit 4: Managing a Professional Engineering Project*, to provide students with the professional standards for engineers and to guide them on how to develop the range of employability skills needed by professional engineers.

Among the topics included in this unit are: engineering strategy and services delivery planning, the role of sustainability, Total Quality Management (TQM), engineering management tools, managing people and becoming a professional engineer.

On successful completion of this unit students will be able to construct a coherent engineering services delivery plan to meet the requirements of a sector-specific organisation or business. They will display personal commitment to professional standards and obligations to society, the engineering profession and the environment.

This unit is assessed by a Pearson-set assignment. The project brief will be set by the centre, based on a theme provided by Pearson (this will change annually). The theme and chosen project within the theme will enable students to explore and examine a relevant and current topical aspect of professional engineering. Students will undertake this project individually.

Learning Outcomes

By the end of this unit students will be able to:

1. Evaluate the risk evaluation theories and practices associated with the management of projects for the production of current and developing technology.
2. Produce an engineering services delivery plan that meets the requirements of a sector-specific organisation.
3. Develop effective leadership, individual and group communication skills.
4. Develop personal commitment to professional standards and obligations to society, the engineering profession and the environment.

Essential Content

LO1 **Evaluate the risk evaluation theories and practices associated with the management of projects for the production of current and developing technology**

The engineering business environment:

Organisational structures and functional elements.

Strategic planning and deployment.

Engineering strategy and services delivery planning.

The role of sustainability.

Total Quality Management (TQM).

Logistics and supply chain management.

New product development strategies.

Legal obligations and corporate responsibility.

Engineering relationships:

The relationship between engineering and financial management, marketing, purchasing, quality assurance and public relations.

LO2 **Produce an engineering services delivery plan that meets the requirements of a sector-specific organisation**

Engineering management tools:

Problem analysis and decision-making, risk management, change management, performance management, product and process improvement, project management and earned value analysis.

LO3 **Develop effective leadership, individual and group communication skills**

Managing people:

Describe the most effective leadership styles.

Techniques to effectively manage teams.

Steps to follow for delivering effective presentations.

Meeting management skills.

Communication and listening skills.

Negotiating skills.

Human error evaluation.

Coaching and mentoring.

L04 **Develop personal commitment to professional standards and obligations to society, the engineering profession and the environment**

Becoming a professional engineer:

Engineering social responsibility.

Importance of being active and up to date with the engineering profession, new developments and discoveries.

Methods of Continuing Professional Development (CPD).

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
<p>L01 Evaluate the risk evaluation theories and practices associated with the management of projects for the production of current and developing technology</p>		<p>D1 Specify and analyse the challenges encountered when meeting the requirements for successfully managing engineering activities, and make justified recommendations to overcome these challenges.</p>
<p>P1 Evaluate the risk evaluation theories and practices associated with the management of engineering projects.</p> <p>P2 Assess elements and issues that impact the successful management of engineering activities.</p>	<p>M1 Critically evaluate the main elements and issues that impact the successful management of engineering activities.</p>	
<p>L02 Produce an engineering services delivery plan that meets the requirements of a sector-specific organisation</p>		<p>D2 Critically evaluate contingencies that might prevent the delivery plan meeting the requirements of a sector-specific organisation.</p>
<p>P3 Develop an engineering services delivery plan, applying the appropriate sector-specific requirements.</p> <p>P4 Determine the engineering management tools needed for designing an engineering services delivery plan.</p>	<p>M2 Evaluate how each step of the delivery plan developed meets the requirements of a sector-specific organisation.</p>	
<p>L03 Develop effective leadership, individual and group communication skills</p>		<p>D3 Critically evaluate effective ways for the coaching and mentoring of disillusioned colleagues or of a poorly performing team.</p>
<p>P6 Describe the steps for effective persuasion and negotiation.</p> <p>P8 Explain the steps for managing effective group meetings.</p> <p>P9 Outline the steps to deliver an effective presentation.</p>	<p>M3 Evaluate leadership styles and effective communication skills using specific examples in an organisational context.</p>	

Pass	Merit	Distinction
<p>LO4 Develop personal commitment to professional standards and obligations to society, the engineering profession and the environment</p>		<p>D4 Evaluate and provide justifications on why it is necessary to be active and up to date with the engineering profession's new developments and discoveries.</p>
<p>P10 Discuss the context of social responsibility for scientists and engineers.</p> <p>P11 Explore the ways in which an engineer can engage in continuing professional development.</p>	<p>M4 Summarise the engineering profession ethical standards and patterns of behaviour.</p>	

Recommended Resources

Textbooks

BURNS, B. (2014) *Managing Change*. 6th Ed. Pearson.

DEARDEN, H. (2013) *Professional Engineering Practice: Reflections on the Role of the Professional Engineer*. CreateSpace Independent Publishing Platform.

KARTEN, N. (2010) *Presentation Skills for Technical Professionals*. IT Governance Ltd.

LOCK, D. (2013) *Project Management*. 10th Ed. Routledge.

Electronic

Becoming a professional engineer – *Engineering Council, (2013) UK Standard for Professional Engineering Competence, 3rd Edition:*

[https://www.engc.org.uk/engcdocuments/internet/Website/UK-PEC%20third%20edition%20\(1\).pdf](https://www.engc.org.uk/engcdocuments/internet/Website/UK-PEC%20third%20edition%20(1).pdf)

Becoming a professional engineer – Engineers Without Borders:

<http://www.ewb-uk.org/>

Links

This unit links to the following related units:

Unit 4: Managing a Professional Engineering Project