UNIT: 4 Managing a Professional Engineering Project

For use with the following qualifications:

Pearson BTEC Level 4 Higher National Certificate and Level 5 Higher National Diploma in Engineering

Pearson BTEC Level 4 Higher National Certificate and Level 5 Higher National Diploma in Aeronautical Engineering

Pearson BTEC Level 4 Higher National Certificate and Level 5 Higher National Diploma in Nuclear Engineering

Applies to the delivery of the unit: 1st September 2018 - 31st August 2019

Issue 1
Edexcel, BTEC and LCCI qualifications

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1.1 Introduction to theme

The Pearson-set theme for use with Unit 4: Managing a Professional Engineering Project is **Sustainability**

Sustainable engineering is the process of designing, operating or maintaining systems in a way that they use energy and resources sustainably, in other words, at a rate that does not compromise the natural environment, or the ability of future generations to meet their own needs.

The Engineering Council describes the role of the professional engineer in sustainability as;

‘Professional engineers have a significant role to play in sustainability. They work to enhance the welfare, health and safety of all, with the minimal use of natural resources and paying due regard to the environment and the sustainability of resources. Their work is influenced by the opportunities and challenges that sustainability brings. Engineers are the providers of options and solutions to maximise social value and minimise environmental impact.

There are pressing challenges due to the adverse effects of depletion of resources, environmental pollution, rapid population growth and damage to ecosystems. A purely environmental approach is insufficient, and increasingly engineers are required to take a wider perspective including goals such as poverty alleviation, social justice and local and global connections. Globalisation brings important opportunities for engineers to promote change through sharing experience and good practice. The leadership and influencing role of engineers in achieving sustainability should not be under-estimated. Increasingly this will be as part of multi-disciplinary teams that include non-engineers, and through work that crosses national boundaries.’

As such they have defined six guiding principles to inform engineers in their decision-making processes;

1. Contribute to building a sustainable society, present and future
2. Apply professional and responsible judgement and take a leadership role
3. Do more than just comply with legislation and codes
4. Use resources efficiently and effectively
5. Seek multiple views to solve sustainability challenges
6. Manage risk to minimise adverse impact to people or the environment
In engineering, incorporating sustainability into products, processes, technology systems, and services generally means integrating environmental, economic, and social factors in the evaluation of designs.

This unit will enable students to examine the broad ranging aspects of sustainability from the standpoint of a prospective Professional Engineer. Furthermore, students will be able to analyse engineering functions and their impact on the environment, whilst combining the principles of sustainable design with the responsibilities placed upon Professional Engineers.

1.2 Choosing a project type

Tutors will need to devise a project brief for the student to follow for the completion of the assignment for this unit.

The type of project chosen for the selected topic should allow for a sufficient degree of research through the existence of adequate background materials and allow for the depth and breadth of study suitable for a level 4 qualification.

Guidance for tutors is available in the Pearson-set Assignment Guidance for Unit 4: Managing a Professional Engineering Project. This provides a range of project types and examples that could be utilised for a project. The project types provided are not exhaustive or mandatory and tutors are encouraged to be innovative with their ideas.

Please note that if reasonable adjustments are necessary to meet a specific individual student need you are able to adjust internal assessments to take this into account. Any adjustments must be considered in relation to the centre's policies on equality & diversity and student support.

Further details on how to make adjustments for students with protected characteristics are given in the document ‘Pearson Supplementary Guidance for Reasonable Adjustment and Special Consideration in Vocational Internally Assessed Units’ available on our website (http://qualifications.pearson.com).

1.3 Project Evidence / Outcomes

It is important to recognise that project work is reliant on gathering information/data that can be analysed. The scale of a Level 4 project means that there must be time for both primary and secondary research. A suggested model would be to use secondary research to provide a context for the student to conduct and interpret data collected through primary research. The project could then yield data/information that could be compared with the findings of secondary research.
In assessing the project, the assessor should be able to see how project objectives have been met, how students have explored the research material relevant to the project objective, how students have developed and formulated their findings and answers to the central questions posed by the objectives and what they have learned in carrying out their project investigation. An important part of the conclusion must be an awareness of the significance of results. Well-edited, focused writing and presentation, where the key decisions, developments, lines of argument and salient research are explained succinctly, is preferable to unstructured writing and presentation where little attempt to select or edit material has been made.

It is important to recognise that there are many different formats that a student may use to present their work and it is important that tutors think carefully about the suitability of the format in relation to the target audience. Both verbal and written forms of communication should be appropriate to the audience, both in terms of the nature and level of material they use and also in terms of length. Students should be guided to produce research that gives a succinct account of the main arguments or developments from their project. If a verbal presentation is the chosen format, the question and answer session should address issues raised by the presentation, but also give students an opportunity to reflect on their work.

In addition to their research findings, students are asked to submit a project management plan, a completed log book and performance review as evidence for the unit.

**The project management plan** is designed to define how the project is to be planned, executed and monitored. The project management plan should give details of the actions required for the integration and co-ordination of various planning activities to carry out the project.

**The project log book** is designed to provide evidence of the project development process and ongoing reflection. It should provide evidence that the student has thought about the direction of their project and in particular, what problems they encountered and steps taken to address them.

**The performance review** will provide evidence of reflection and evaluation of the project management process and individual performance.

### 1.4 Employer engagement

It is advisable that centres look at the Pearson-set Assignment as an appropriate unit to embed employer engagement, although this is not a mandatory requirement. Developing and establishing links with employers enhances the teaching and learning experience and improves students' employability. Real-life projects provide students with the opportunity to develop and acquire appropriate skills, knowledge and expertise required by employers.
1.5 Sharing of good practice

The Pearson-set Assignment unit will usually be a sampled unit by the centre appointed External Examiner (EE) as part of the annual Pearson EE centre visit. The focus will be on standardisation of student assessed work and sharing of good practice. The EE will review and identify exemplars in all aspects of good practice. Good practice will focus on current themes that align to QAA Higher Education Reviews:

- Innovation
- Digital literacy
- Student employability and entrepreneurial skills
- Employer engagement
- Quality of assessment feedback.

1.6 Resources and useful links

Suggested resources and links that centres may find useful are shown below. Centres should choose those resources that are relevant for localised use and complement those with additional resources to support independent research in the chosen topic and project type.

<table>
<thead>
<tr>
<th>Type of Resource</th>
<th>Resource Titles</th>
<th>Links</th>
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<tbody>
<tr>
<td>Useful resources for underlying principles of LCA, examples of published reports on engineering activities</td>
<td>Lock, D — <em>The Essentials of Project Management</em> (Gower Publishing,) ISBN: 9781472442536</td>
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<td>Type of Resource</td>
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<td></td>
<td>ISBN: 9781405168021</td>
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<td>Webpage</td>
<td>Sustainable Engineering</td>
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<tr>
<td>Website</td>
<td>Network for Business Innovation and Sustainability</td>
<td><a href="http://www.nbis.org">www.nbis.org</a></td>
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<tr>
<td></td>
<td>Useful links for case studies of Sustainability activities.</td>
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<tr>
<td>Webpage</td>
<td>Environmental sustainability</td>
<td><a href="https://www.theiet.org/membership/career/ethics/values/sustainability/index.cfm">https://www.theiet.org/membership/career/ethics/values/sustainability/index.cfm</a>?</td>
</tr>
<tr>
<td>Published Report</td>
<td>The importance of environmental sustainability in engineering, and a case study.</td>
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The Pearson-set Assignment Guidance for Unit 4: Managing a Professional Engineering Project should be read in conjunction with this theme release. It provides advice and guidance for both tutors and students.

For any further additional support or queries regarding this document, please email btecdelivery@pearson.com.