Pearson
Higher Nationals in
Engineering / Aeronautical Engineering / Nuclear Engineering / Rail Engineering / Manufacturing Operations

PEARSON-SET THEME

UNIT: 4 Managing a Professional Engineering Project

For use with the following qualifications:
Pearson BTEC Level 4 Higher National Certificate in Engineering
Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering
Pearson BTEC Level 4 Higher National Certificate in Nuclear Engineering
Pearson BTEC Level 4 Higher National Certificate in Rail Engineering
Pearson BTEC Level 4 Higher National Certificate in Manufacturing Operations

Applies to the delivery of the unit: 1st September 2019 - 31st August 2020

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;

**Reliability**

Reliability engineering is the process of designing, operating or maintaining systems, products or components so that they function and operate under the design operating conditions dependably, with negligible probability of failure for their design life (i.e. from conception to decommission). As reliability is the probability of success, it is used as a measure of a system's, product's or component's success at performing its function properly during its design life.

When systems have proven to be unreliable due to poor design, operation or maintenance, the results in many instances have been catastrophic to life, the environment, health, safety and the economy. For this reason, reliability is a central consideration for engineers and they need a comprehensive understanding of the nature of and threats from errors, failures, hazards and risks; and the means by which these threats can be mitigated through prevention, forecasting and the inclusion of safety factors and tolerances.

This unit will enable students to examine the broad ranging aspects of reliability from the standpoint of a prospective professional engineer. Furthermore, students will be able to analyse engineering functions and their impact on the health, safety and environment, whilst combining the approach of reliable 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.

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<thead>
<tr>
<th>Type of Resource</th>
<th>Resource Titles</th>
<th>Links</th>
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<tbody>
<tr>
<td>Useless resources for underlying principles of LCA, examples of published reports on engineering activities</td>
<td></td>
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<tr>
<td>Textbook</td>
<td>Lock, D — The Essentials of Project Management (Gower Publishing,) ISBN: 9781472442536</td>
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<tr>
<td>Webpage</td>
<td>Reliable Plant</td>
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<td>Webpage</td>
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<td><a href="https://www.weibull.com/basics/reliability.htm">https://www.weibull.com/basics/reliability.htm</a></td>
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<td>Useless links for case studies of Reliability activities</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.