

# Higher National Certificate/Diploma Assessment

Qualification		Pearson BTEC Higher Nationals for England (2024)			
Unit number and title		4017. Quality and Process Improvement			
Assignment title		Industry Standards and Total Quality Management			
Assessor		Engineering Team			
Academic year	1	Unit Code	H/615/1491	Assignment	2 of 2
Internal Verifier	Dr Michael Shaw		Verification Date	1 <sup>st</sup> September 2025	
Issue Date	1 <sup>st</sup> September 2025		Final Submission Date	No later than 31st August 2026	

## Policy on the Use of Artificial Intelligence (AI)

- Students are required to acknowledge the use of AI in the preparation of any assignment.
- AI tools **may be** permissible for use as learning aids, subject to the AI Assessment Scale designation given below.
- AI cannot be used to generate the final, submitted work in its entirety.
- AI cannot be used to substitute for a student's own critical thinking, analysis, and original expression.
- Assignments must reflect the student's original thought and understanding.
- Assignments are checked automatically on submission for AI content, through Turnitin.
- Assignment grades are only confirmed following viva voce examination at the end of each unit.

## Artificial Intelligence Assessment Scale (AIAS)

Full details of the Artificial Intelligence Assessment Scale (AIAS) are available at [this link](#).

### The AI Assessment Scale (AIAS)

Level	Description	Guidelines
1 NO AI	The assessment is completed entirely without AI assistance in a controlled environment, ensuring that students rely solely on their existing knowledge, understanding, and skills.	You must not use AI at any point during the assessment. You must demonstrate your core skills and knowledge.
2 AI PLANNING	AI may be used for pre-task activities such as brainstorming, outlining and initial research. This level focuses on the effective use of AI for planning, synthesis, and ideation, but assessments should emphasise the ability to develop and refine these ideas independently.	You may use AI for planning, idea development, and research. Your final submission should show how you have developed and refined these ideas.
3 AI COLLABORATION	AI may be used to help complete the task, including idea generation, drafting, feedback, and refinement. Students should critically evaluate and modify the AI suggested outputs, demonstrating their understanding.	You may use AI to assist with specific tasks such as drafting text, refining and evaluating your work. You must critically evaluate and modify any AI-generated content you use.
4 FULL AI	AI may be used to complete any elements of the task, with students directing AI to achieve the assessment goals. Assessments at this level may also require engagement with AI to achieve goals and solve problems.	You may use AI extensively throughout your work either as you wish, or as specifically directed in your assessment. Focus on directing AI to achieve your goals while demonstrating your critical thinking.
5 AI EXPLORATION	AI is used creatively to enhance problem-solving, generate novel insights, or develop innovative solutions to solve problems. Students and educators co-design assessments to explore unique AI applications within the field of study.	You should use AI creatively to solve the task, potentially co-designing new approaches with your instructor.

This assignment is based on the AIAS level indicated by the colour above.  
Follow the instructions for that level.

If the submitted work falls outside the scope of the AIAS designation above, the assignment will be failed.

## References

- Prepare your references and correctly cite them within the body of your assignment using [zbib.org](https://www.zbib.org).
- Use the Harvard referencing standard of any of the listed UK universities.
- In [zbib.org](https://www.zbib.org), create a 'Link to this Version' and copy it into your References section.
- **Assignments will be rejected if this process is not followed correctly.**

## Submission Format

All text elements of your submission should be word processed, mathematical solutions can be handwritten (neatly) and scanned into your document.

### Assignment Format

- **Organisation:** Use clear headings, paragraphs, and sub-sections, to ensure clarity and ease of reading. Refer to Task numbers or sections to make it clear which question you are answering.

### Assignment Structure

Your assignment **MUST** include the following sections:

- **Cover Page:** Your Course, Name, Unit Name and Assignment number/name
- **Contents Page:** List tasks or questions with page numbers.
- **References:** Correctly cite and list all sources used, but do not use Wikipedia. Please see the detailed advice on page 1.

### Submission Requirements

By submitting your assignment, you confirm the following:

- **Originality:** The work is your own, with all sources properly cited.
- **Plagiarism:** You acknowledge that plagiarism and collusion are forms of academic misconduct and are strictly prohibited.
- **Plagiarism Detection:** Your assignment will be submitted to TurnItIn, a plagiarism detection service, that compares your work against databases, online sources, and other students' work.
- **False Declaration:** Making a false declaration is academic misconduct.

<b>Vocational Scenario or Context</b>	<p>Following your comprehensive report and the subsequent financial analysis, the CEO has identified a critical production bottleneck in the final assembly process, leading to significant delays and increased labour costs. As the newly appointed quality manager, you are tasked with addressing this issue by proposing a strategic plan based on modern process improvement methodologies. You are tasked with researching and preparing a short report for a cross-functional project team.</p>
<b>Task 1</b>	<ul style="list-style-type: none"> <li>a) Explain the core principles of <b>Lean Manufacturing</b> and its primary objective of eliminating waste (Muda). Discuss how these principles could be applied to streamline the company's electronic component assembly line.</li> <li>b) Detail the steps involved in conducting a <b>Value Stream Mapping (VSM)</b> exercise. Explain how this tool would be used to identify areas of waste and inefficiency within the production process.</li> <li>c) Provide a practical overview of the <b>5S methodology</b> (Sort, Set in Order, Shine, Standardize, Sustain). Justify how implementing this tool would improve both efficiency and workplace safety.</li> <li>d) Describe the <b>philosophy of Kaizen</b> and explain how it complements Lean Manufacturing principles. Discuss how a culture of continuous improvement can empower employees and lead to long-term operational gains.</li> <li>e) Outline the key steps for planning and executing a <b>Kaizen event</b> (also known as a rapid improvement workshop). Specify the roles of different team members and the expected outcomes of the event.</li> </ul>
<b>Task 2</b>	<ul style="list-style-type: none"> <li>a) Analyze the core principles of <b>Total Quality Management (TQM)</b> and discuss how their application can significantly improve performance in both a manufacturing setting (e.g., electronic circuit production) and a service environment (e.g., customer support). Justify the effectiveness of TQM in enhancing a company's overall performance.</li> <li>b) Develop a high-level, <b>six-step implementation plan</b> to achieve <b>ISO 9001:2015 certification</b> for the company. For each step, provide a brief description of the key activities and goals. The plan should be presented in a logical, sequential format, from initial commitment to final certification and beyond.</li> </ul>

**Sources of  
information  
to support  
you with this  
Assignment**

### Print Resources

- Amsden R.T. (2019). *SPC simplified: Practical steps to quality*. Routledge.
- Begum S., Rajendran C., Prakash Sai L., Ganesh K. and Mohapatra S. (2021) *Total Quality Management in Higher Education: Study of Engineering Institutions*. 1st Edition. Routledge India.
- Cachon G. and Terwiesch C. (2023) *Operations Management*. 3rd Edition. McGraw-Hill  
Cottmon R.J. (2020) *Total Engineering Quality Management*. 1st Edition. CRC Press.
- Goetsch D.L. and Davis S. (2021) *Quality Management for Organizational Excellence: Introduction to Total Quality*. 9th edition. Pearson.
- Lim J.S. (2020) *Quality Management in Engineering: A Scientific and Systematic Approach*. 1st Edition. CRC Press.
- Mathur S. (2021) *Book Review of Total Quality Management in Education. Management Dynamics*.
- Montgomery D.C. (2019) *Introduction to statistical quality control*. John Wiley & sons.  
Stevenson W.J (2021) *Operations Management*. 14th Edition. McGraw-Hill.
- Slack, N., Chambers, S. and Johnston, R. (2016) *Operations Management*. 8th Ed. Essex: Pearson Education Limited.

### Journals

*Note: Example journals listed below provide a broad range of articles related to unit content and those relevant for the qualification. Staff and students are encouraged to explore these journals and any other suitable journals to support the development of academic study skills, and subject specific knowledge and skills as part of unit level delivery.*

[Journal of Quality in Maintenance](#)

[Engineering The TQM Journal](#)

[Quality Management Journal](#)

### Links

This unit links to the following related units:

*Unit 5016: Lean Manufacturing*

## Relevant Learning Outcomes and Assessment Criteria

Pass		Merit	Distinction
<b>L03</b>	<b><i>Determine the role of standards in improving efficiency, meeting customer requirements and opening up new opportunities for trade</i></b>	<b>L03</b>	
<b>P5</b>	Determine required standards to improve efficiency, meet customer requirements and open up new opportunities for trade.	<b>M3</b>	Discuss the importance of standards applied in the engineering environment.
		<b>D3</b>	Illustrate a plan for the application of international standards that would improve efficiency, meet customer requirements and open up new opportunities for trade.
<b>L04</b>	<b><i>Analyse the importance of Total Quality Management and continuous improvement in manufacturing and service environments.</i></b>	<b>L04</b>	
<b>P6</b>	Contrast the principles, tools and techniques of Total Quality Management and continuous improvement.		
	Analyse how the concept of Total Quality Management and continuous improvement could help in delivering high quality performance within businesses.	<b>M4</b>	Discuss how the appropriate application of Total Quality Management and continuous improvement in tools and techniques affect quality performance in the manufacturing and service environments.
<b>P7</b>		<b>D4</b>	Evaluate how the appropriate application of Total Quality Management and continuous improvement in tools and techniques affect quality performance in the manufacturing and service environments.