BAT311: Fundamentals of Sustainable Manufacturing Processes

Scheme of work

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Scheme of work

Course/qualification: Vehicle Electrification **Tutor's name**: _____

Number of sessions: 5 **Delivery hours**: 16 **Venue**: _____**Group**: _____

Learning Outcomes	
1. Appreciation of current battery technology and materials 2. Understand and recall the current processes of making a Lithium-Ion battery 3. Define sustainability using the 3 pillars of sustainability 4. Apply knowledge of sustainability to the battery manufacturing industry 5. Recall strategies to improve sustainability in battery manufacturing	

Session	**Learning Outcome No.**	Activities and resources	Assessment
1 (Day 1 - AM)	**LO1** - Appreciation of current battery technology and	Learners to complete slides 1 – 18	Questioning and knowledge check

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Session	**Learning Outcome No.**	Activities and resources	Assessment
– 1.5 Hours	materials	Assessment Criteria: 1. Know the difference between a battery and a cell. 2. Know the correct terminology for batteries 3. Recall the history of batteries and which batteries are currently still being used 4. Understand the difference between a cell, a module and a pack. Learners to be shown and be able to handle different types of cells & batteries	on slide 16
2 (Day 1 - AM) – 2 Hours	**LO2** - Understand and recall the current processes of making a Lithium-Ion battery	Learners to complete slides 19 – 33 Assessment Criteria: 1. Know the basic manufacturing steps taken in Electrode 2. Know the basic manufacturing steps taken in Cell Assembly Will get to pouch electrolyte filling in the process before Lunch. Encourage discussions about what the delegates think is happening in each stage and promote delegate-lead learning by sharing of experience.	Questioning and feedback from delegates. Discussions should be encouraged to prove learning

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Session	**Learning Outcome No.**	Activities and resources	Assessment
2 (Day 1 - PM) 2 hours	**LO2** - Understand and recall the current processes of making a Lithium-Ion battery	Learners to complete slides 34 – 47 Assessment Criteria: 1. Know the basic manufacturing steps taken in Cell Assembly (Cont.) 2. Know the basic manufacturing steps taken in Module and Pack	Questioning and feedback from delegates. Discussions should be encouraged to prove learning
2 (Day 1 - PM) – 1.5 Hours	**LO2** - Understand and recall the current processes of making a Lithium-Ion battery	Slide 48 -49 Leaners to have a walk through a battery manufacturing line (preferred) or watch a video reinforcing what they have already learnt about battery manufacturing. If no line tour can be procured a video tour will cover what is needed – the tour/video should focus on showing the delegates a battery manufacturing line but also be used to test knowledge gained. Question examples: What process is happening here? Walk me through the stages we have covered so far? What happens in this area?	Questions while tour of the line is taking place
3 (Day 2 – AM 2.5 hrs)	**LO3** - Define sustainability using the 3 pillars of sustainability	Learners to complete slides 50 - 57 Assessment Criteria:	

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Session	**Learning Outcome No.**	Activities and resources	Assessment
		1. Recall what sustainability is 2. Recall the 3 pillars of sustainability 3. Describe and recall the tools that can be used to measure sustainability Activity – Cookie Mining An involved activity where delegates try to "Mine" chocolate chips from a cookie without causing damage to the cookie (earth) derived from a KS3 activity around mining impact. The activity includes monetary values for damage, pollution/mining time and sustainability.	
3 (Day 2 – AM/PM 2 hrs)	**LO4 -** Apply knowledge of sustainability to the battery manufacturing industry	Learners to complete slides 58 - 65 Assessment Criteria: 1. Recall what environmental impact, social impact and economic impact is 2. Describe where energy use is significant on a battery manufacturing line	
4 (Day 2 – PM 2 hrs)	**LO5** - Recall strategies to improve sustainability in battery manufacturing	Learners to complete slides 66 - 77 Assessment Criteria: 1. Recall strategies to improve sustainability in battery manufacturing	

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Session	**Learning Outcome No.**	Activities and resources	Assessment
		2. Recall how toolsets are used to assess sustainability Task – calculate environmental impact of a battery pack.	
5 (Day 2 – PM) 0.5 hours		Slides 78 – 80 Round up	

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