

UEECD0004 Apply material science to solving electrotechnology engineering problem

Elements and performance criteria

Elements		Performance criteria		
Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.		
1	Identify electrotechnology problem/s	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied	OHS Process and procedures for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf
		1.2	WHS/OHS risk control work preparation measures and workplace procedures are followed	OHS Risk Control for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf
		1.3	Scope of electrotechnology problem and material for the environment are obtained and applied from documentation and/or work supervisor	CLASS LESSON Engineering Materials Class Lesson.pdf READERS Properties of materials/metals/polymers/thermoplastics/ceramics/chemical

Elements		Performance criteria		
				<p>bonding/ionic bond/metallic bond/covalent bond/ production/ strength/electrical properties/ thermal properties/ durability/ corrosion resistance</p> <p>force extension diagram/carbon steel/brinell hardness test/fatigue testing/safety factor/ casting/carbon state change diagram,nickel copper equilibrium diagram /smelting/steel manufacturing</p> <p>electric arc furnacing/heat treatment/alloying/induction hardening/polyethylene/ polyvinyl chloride/hardness test/ceramic/glass/mortar/matrix materials/welding/service requirement</p> <p>Problem Calculation</p> <p>Engineering Materials Problem Calculations Video Lessons.pdf</p>
		1.4	Tools, equipment and testing devices required for work are obtained and checked for correct operation and safety	<p>Set up tools and materials for Electrolysis Practical & Materials Thermal expansion practical</p> <p>UEEEL0008- TSP01.2.pdf</p> <p>UEE-CD0046 TSP 5.2 .pdf</p>

Elements		Performance criteria		
2	Apply material science to developing solutions	2.1	WHS/OHS risk control work measures and workplace procedures are followed	OHS Risk Assessment for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf
		2.2	Tests and measurements are undertaken in accordance with WHS/OHS requirements and workplace procedures	OHS Risk Assessment for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf
		2.3	Tests, measurements and results are used to identify material science solutions to electrotechnology problems	1/Electrolysis Practical for Chemical Properties 2/Thermal Relay Practical for materials expansion properties
		2.4	Effects on environments, materials and health risks are considered in resolving electrotechnology problems	Safety disposal of chemicals used in Electrolysis Practical UEE-CD0046 TSP 5.2 .pdf

Elements		Performance criteria		
		2.5	Unplanned situations are dealt with in accordance with WHS/OHS and approval of relevant person/s	Prepare the plan to clean up the electrolyte in the case of chemical spill.
3	Report solution/s	3.1	Proposed solutions to electrotechnology problems are documented with justification for the solutions	Prepare the report for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf
		3.2	Identified health risks exposed by a material and/or application is documented in workplace report	Chemical hazards identification and protection for chemicals used in Electrolysis Practical UEE-CD0046 TSP 5.2 .pdf
		3.3	Proposed solution report is forwarded to relevant person/s in accordance with workplace procedures	Submit the report for Electrolysis Practical & Materials Thermal expansion practical UEEEL0008- TSP01.2.pdf UEE-CD0046 TSP 5.2 .pdf And submit it to assessor Feedback Session

Performance evidence

<p>Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:</p>	
<ul style="list-style-type: none">• applying material science to developing solutions to electrotechnology problems• applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including<ul style="list-style-type: none">◦ using risk control measures• considering environment and health risks in resolving electrotechnology problems• dealing with unplanned situations in accordance with WHS/OHS and approval from relevant person/s• documenting proposed solutions and justification• obtaining the scope of electrotechnology problem and materials to be used• obtaining tools, equipment and testing devices• interpreting results to identify material science solutions to electrotechnology problems• using testing devices• using test and measurement results to identify material science solutions.	<p>Practical Tasks</p> <p>Chemical hazards identification and protection for chemicals used in Electrolysis Practical</p> <p>UEE-CD0046 TSP 5.2 .pdf</p> <p>Problem Solving Tasks</p> <p>Engineering Materials Problem Calculations Video Lessons.pdf</p> <p>Exercise Assignments</p> <p>UEECD0004 Engineering Materials Exercises Assignment</p>

Knowledge evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

<ul style="list-style-type: none">• problem-solving techniques• relevant classification, nature and physical properties of materials used in electrotechnology• relevant environment and health issues• relevant job safety assessments or risk mitigation processes• relevant manufacturer specifications and operating instructions• relevant material processing and manufacturing• relevant material science• relevant tests and measurement• relevant tools, equipment and testing devices• relevant WHS/OHS legislated requirements• relevant workplace documentation, including<ul style="list-style-type: none">○ solution report	<p>CLASS LESSON</p> <p>Engineering Materials Class Lesson.pdf</p> <p>READERS</p> <p>Properties of materials/metals/polymers/thermoplastics /ceramics/chemical bonding/ionic bond/metallic bond/covalent bond/ production/ strength/electrical properties/ thermal properties/ durability/ corrosion resistance</p> <p>force extension diagram/carbon steel/brinell hardness test/fatigue testing/safety factor/ casting/carbon state change diagram,nickel copper equilibrium diagram /smelting/steel manufacturing</p> <p>electric arc furnacing/heat treatment/alloying/induction hardening/polyethylene/ polyvinyl chloride/hardness test/ceramic/glass/mortar/matrix materials/welding/service requirement</p> <p>Problem Calculation</p>
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<ul style="list-style-type: none"> • relevant workplace instruction, policies and procedures. 	<p>Engineering Materials Problem Calculations Video Lessons.pdf</p> <p>ASSESSMENT</p> <p>UEECD0004 Engineering Materials Exercises Assignment</p>
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Textbooks

- Materials-for-engineers-and-technicians

Practical Instruction and Worksheet

- UEEEL0008- TSP01.2.pdf
- UEE-CD0046 TSP 5.2 .pdf
- Engineering Materials Online Simulated Practical

Class Lesson Notes

- Engineering Materials
- Engineering Materials Class Lesson

Class Lesson Video Links

- Engineering Materials Problem Calculations Video Lessons

Exercises

- UEECD0004 Engineering Materials Exercises Assignment