

## COMPOSITES CURRICULUM - Unit Information

This unit forms part of the Masters level Composites Curriculum developed by Bristol and Plymouth Universities.

<b>Taught block title</b>	Manufacturing Processes B	
<b>Unit title</b>	Processes for ceramic matrix composites and metal matrix composites	
<b>Level (Credit points)</b>	M (2)	
<b>Unit director</b>	Kevin Potter	
<b>Unit description</b>		
This unit forms part of the Masters level Composites Curriculum. It provides Learners with no prior experience with composites with a general introduction to the processes that can be used in the manufacture of components and structures using ceramic matrix composites and metal matrix composites.		
<b>Core subjects to be covered</b>		
<ol style="list-style-type: none"> <li>1. Background and history</li> <li>2. CMC</li> <li>3. CMC</li> <li>4. CMC</li> <li>5. CMC</li> <li>6. CMC</li> <li>7. Machining processes for ceramic matrix composites Particulate metal matrix composites processes – Stir casting</li> <li>8. Particulate metal matrix composites processes – Squeeze casting</li> <li>9. Particulate metal matrix composites processes – Powder metallurgy approaches</li> </ol>	<ol style="list-style-type: none"> <li>10. Particulate metal matrix composites processes – nanoscale reinforcements</li> <li>11. Fibre/whisker reinforced metal matrix composites</li> <li>12. Fibre reinforced metal injection moulding</li> <li>13. Fibre manipulation and preform preparation</li> <li>14. Preform infiltration</li> <li>15. Fibre reinforced metal Solid state processing</li> <li>16. In situ synthesis of reinforced metals</li> <li>17. Process comparison and process selection</li> <li>18. Machining processes for metal matrix composites</li> </ol>	
<b>Statement of unit aims</b>		
<p>The aims of this unit are to:</p> <ol style="list-style-type: none"> <li>1. Provide Learners with an overview of the processes for the manufacture of components and structures by routes to ceramic matrix composites</li> <li>2. Provide Learners with an overview of the processes for the manufacture of components and structures by routes to metal matrix composites</li> <li>3. Provide learners with an understanding of the capabilities and limitations of the available processes that can be applied in a part design environment</li> </ol>		
<b>Statement of learning outcomes</b>		
<p>Learners will be able to:</p> <ol style="list-style-type: none"> <li>1. Identify appropriate processes for the manufacture of components in ceramic and metal matrix composites</li> <li>2. Understand the ways in which process selection impacts on costs and performance of ceramic and metal matrix composites</li> <li>3. Understand how to introduce the potential for ceramic and metal matrix composites in a design environment</li> </ol>		
<b>Methods of teaching</b>	7 lectures, 2 lab classes and demonstrations, 1 class exercise	
<b>Assessment details if required</b>	Written assignment (85%), 20 minute assessed presentation (15%)	
<b>Timetable information</b>	2 days of teaching in a block	