

## 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 A	
<b>Unit title</b>	Reinforcement manipulation and preforming	
<b>Level (Credit points)</b>	M (2)	
<b>Unit director</b>	Professor Kevin Potter	
<b>Unit description</b>		
<p>This unit forms part of the Masters level Composites Curriculum. It introduces Learners to the handling and manipulation of broad goods reinforcements both dry and preimpregnated and to the requirements for the production of complex preforms for subsequent further processing.</p> <p>The course will be delivered from processing science and manufacturing engineering perspectives.</p>		
<b>Core subjects to be covered</b>		
<ol style="list-style-type: none"> <li>1. Handling and manipulating rolls of reinforcement</li> <li>2. Cutting methods, manual and automated</li> <li>3. Nesting cutting patterns to minimise waste</li> <li>4. Pick and place end effectors for handling reinforcements</li> <li>5. Backing film removal for preimpregnated reinforcements</li> <li>6. Deformation modes for reinforcements</li> <li>7. Forming reinforcements to required geometries, draping versus darting</li> <li>8. Manual lay-up of preimpregnated reinforcements</li> </ol>	<ol style="list-style-type: none"> <li>9. Best practice in the design of lay-up strategies</li> <li>10. Developing Manufacturing Instruction Sheets for manual lay-up</li> <li>11. Automation of manufacture using preimpregnated broad goods</li> <li>12. Preforming of dry/bound reinforcements</li> <li>13. Binders</li> <li>14. Preform equipment design</li> <li>15. Defining a set of preforms to generate a required complex geometry</li> <li>16. Case studies</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 reinforcement handling and manipulation processes</li> <li>2. Demonstrate the means by which reinforcements may be cut, transferred, stacked and otherwise handled</li> <li>3. Provide learners with the understanding to develop reinforcement handling and preforming approaches</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 means of preparing reinforcement packs for subsequent processing</li> <li>2. Identify the strengths and limitations of different approaches</li> <li>3. Support the design of preforming equipment and processes</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	