

<b>Taught block title</b>	PRODUCT DESIGN A	
<b>Unit title</b>	Drawing Practices and lay-up rules	
<b>Level (Credit points)</b>	H (2)	
<b>Unit director</b>	Martyn Jones/ Prof Richard Day	
<b>Unit description</b>		
This unit forms part of the Masters level Composites Curriculum. It provides learners with detail on good drawing practices and the basis of ply layup rules. It also will enable students to understand and apply industry standard practice through CAD packages for composite design.		
<b>Core subjects to be covered</b>		
<ol style="list-style-type: none"> <li>1. Importance of clear drawings for designers, manufacturers and end users.</li> <li>2. Different fibre architectures and influence of warp/weft</li> <li>3. Material properties, (Anisotropic, Orthotropic, Lamina)</li> <li>4. Ply stacking best practice and drafting rules</li> <li>5. Laminate orientation codes</li> <li>6. Ply books</li> <li>7. Standards and drawing conventions – EN4408-1 to ENG4408-5</li> </ol>	<ol style="list-style-type: none"> <li>8. Ply stacking sequences</li> <li>9. Importance of balanced layups</li> <li>10. Ply drop off guidelines</li> <li>11. Hole positions and influences</li> <li>12. Laminate draping and darts</li> <li>13. CAD based composites design packages (such as Catia Composite workbench) for Ply zones, stacking and ply book creation.</li> </ol>	
<b>Statement of unit aims</b>		
The aims of this unit are to:		
<ol style="list-style-type: none"> <li>1. Demonstrate the importance of communicating composites designs</li> <li>2. Enable designers and manufactures to understand ply drop off areas and transition zones</li> <li>3. Show how darts can be used to allow adequate draping over curves</li> <li>4. Allow students to use industry standard software for composite design.</li> </ol>		
<b>Statement of learning outcomes</b>		
Learners will be able to:		
<ol style="list-style-type: none"> <li>1. Fully understand the relevance and importance of composites drawing standards</li> <li>2. Critically evaluate and scrutinise engineering drawings</li> <li>3. Be proficient in industry standard drafting CAD packages for drawing.</li> </ol>		
<b>Methods of teaching</b>	3 lectures, 2 CAD sessions, 1 practical session, 1 direct learning	
<b>Assessment details if required</b>	100% assessment (2 assignments at 50/50)	
<b>Timetable information</b>	4 days	