

COMPOSITES CURRICULUM - Unit Information

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

Taught block title	Product Design B	
Unit title	Joints, bonded and bolted	
Level (Credit points)	M (2)	
Unit director	Professor Kevin Potter	
Unit description		
<p>This unit forms part of the Masters level Composites Curriculum. It introduces Learners to the processes used to join together composite components and structures or to join such structures onto metallic or other non-composite structures from a manufacturing and outline stress analysis perspective.</p> <p>The course will be delivered from processing science and manufacturing engineering perspectives.</p>		
Core subjects to be covered		
<ol style="list-style-type: none"> 1. Basics of adhesion 2. Advantages of bonded joints 3. Disadvantages of bonded joints 4. Surface energy and wetting 5. Adhesive types 6. Bonded joint configurations 7. Deformations and stress distributions 8. The importance of peel stresses 9. Failure modes and surface preparation 10. Estimation of joint strength 11. Fatigue and environmental effects 12. Basics of mechanically fastened joints 	<ol style="list-style-type: none"> 13. Advantages of bolted joints 14. Disadvantages of bolted joints 15. Bolted joint configurations 16. Design considerations 17. Stresses around a pin joint 18. Bolted joint failure modes 19. Target failure mode 20. Joint strength versus lay-up 21. Fatigue issues 22. Multifastener joints 23. Tolerances and thermal effects 24. Bearing/bypass effects 	
Statement of unit aims		
<p>The aims of this unit are to:</p> <ol style="list-style-type: none"> 1. Provide learners with an overview of jointing techniques for composite structures 2. Identify the major features of bonding and bolting structures, distinguishing the advantages and disadvantages of each approach 3. Enable learners to decide which approach to be used in specific design cases 		
Statement of learning outcomes		
<p>Learners will be able to:</p> <ol style="list-style-type: none"> 1. Identify when bonding or bolting is the appropriate solution 2. Carry out an outline stress analysis to estimate the load bearing capacity of the joint 3. Identify likely failure modes 		
Methods of teaching	7 lectures, 2 lab classes and demonstrations, 1 class exercise	
Assessment details if required	Written assignment (85%), 20 minute assessed presentation (15%)	
Timetable information	2 days of teaching in a block	