

COMPOSITES CURRICULUM - Unit Information

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

Taught block title	Manufacturing Processes B	
Unit title	AFP and ATL	
Level (Credit points)	M (2)	
Unit director	Professor Kevin Potter	
Unit description		
This unit forms part of the Masters level Composites Curriculum. It introduces Learners to two important automated reinforcement collation processes Automated Fibre Placement and Automated Tape Laying. The course will be delivered from processing science and manufacturing engineering perspectives.		
Core subjects to be covered		
<ol style="list-style-type: none"> 1. History and development of the ATL and AFP processes 2. Current status of processes 3. Basic principles of operation, gantry vs robot designs 4. Productivity issues 5. Accuracy and control issues 6. Temperature control and heating strategies 7. Thermoset matrix processing 8. Thermoplastic matrix processing 9. The lay-up head design and operational issues 10. Geometric conformance 	<ol style="list-style-type: none"> 11. Impacts on cured ply thickness and as-laid quality 12. Monitoring and control 13. Advantages and limitations of AFP & ATL 14. Simulation of AFP & ATL 15. Steering effects and tack 16. Dry Fibre AFP issues 17. Tailored blanks and post-forming 18. Principles of part design for AFP & ATL 19. Software tools 20. Integrating AFP & ATL into a manufacturing plant 21. Costing for AFP & ATL 22. Development areas and future research 	
Statement of unit aims		
The aims of this unit are to:		
<ol style="list-style-type: none"> 1. Provide Learners with an overview of the AFP & ATL reinforcement collation processes 2. Identify the advantages and limitations of the processes 3. Identify quality limiting aspects of the processes 4. Provide the learners with information to support the design of composite products to be manufactured by AFP & ATL. 		
Statement of learning outcomes		
Learners will be able to:		
<ol style="list-style-type: none"> 1. Provide a clear overview of the advantages and disadvantages of the AFP & ATL processes for reinforcement collation 2. Understand the features of the AFP & ATL processes and how these may be simulated 3. Understand some of the issues and methodologies involved in the selection and design of composites for manufacture by AFP & ATL 		
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	