**COMPOSITES CURRICULUM - Unit Information**

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

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| **Taught block title** | Product Design A |
| **Unit title** | Acceptance criteria, rework, concessions – Designing out defects |
| **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 some aspects of quality in composite components and structures, and how deviations from the design intent have to be handled when dealing with structurally important structures. The principal focus of the unit is the impact of the design process on defects in production, which overlaps with but is not equivalent to Design for Manufacture.

The course will be delivered from processing science and manufacturing engineering perspectives.

**Core subjects to be covered**

1. The quality assessment process
2. Defining Acceptance Criteria
3. Rework, repair and the concession process
4. Direct costs associated with rework, repair and concessions
5. Production flow disruption and other costs associated with rework, repair and concession
6. Drawing tolerances, what drives them?
7. Manufacturing standards, e.g. for accuracy of ply positions or ply/ply gaps
8. Defining process capability for each step in the process chain
9. Process capability for Manual and Automated processes
10. Achievable tolerances related to materials variability
11. Achievable tolerances related to process variability
12. Impacts of geometrical features on quality Interactions between geometry, part quality and complexity of stress states
13. Inspecting designs for features expected to generate out of tolerance events
14. Methods to reduce the probability of defects arising within a fixed design envelope
15. Estimating the cost of applying methods to reduce defect probability

**Statement of unit aims**

The aims of this unit are to:

1. Provide Learners with an overview of manufactured quality in composites production
2. Clarify the costs of poor quality and the impact of a lack of quality on profitability
3. Provide learners with tools that can help to avoid designs that are prone to defect formation

**Statement of learning outcomes**

Learners will be able to:

1. Identify appropriate acceptance criteria with regard to process capabilities
2. Examine designs with a view to identifying potential for defect generation
3. Identify amendments to designs to minimise the potential for defect generation

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| **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 |