Vacuum Infusion Body of Knowledge

Module 1: General Composites Knowledge (10%)

1. Industry introduction - history, advancements, industry basics
2. Overview of materials and matrix
3. Safety, manufacturing processes, options and choices
4. Why VIP and its many variations

Module 2: Tooling for VIP and Closed Molding Processes (15%)

1. Vacuum Infusion Process and many variations
2. Tooling requirements, options, features for closed molds
3. Fundamentals of tool development and technology
4. Closed mold requirements and options for B side tooling - LRTM, CCBM, other variations

Module 3: Understanding Vacuum and Pressure (10%)

1. Motive force in driving resin flow- comparisons in processing
2. Types of vacuum pumps and vacuum systems
3. Resin volatilization and vacuum pressure

Module 4: Resin Flow Theory (15%)

1. Flow characteristics
2. Darcy's Law and Resin Flow
3. Viscosity, permeability and pressure differential
4. Dynamics of infusion, flow patterns and infusion

Module 5: Vacuum Bag Configuration and Fabrication (10%)

1. Bags, techniques in use, size, sealing and use
2. Fabrication of bags
3. Leaks, drawdown process, leak detection, process

Module 6: VIP Molding Process (15%)

1. Sequence for the VIP Process

Module 7: Light Resin Transfer Molding Process (5%)

1. Process variations - B side molds - infusion

Module 8: VIP and Light RTM Molded Components (8%)

1. Serial production and advanced production
2. Preforms, robotics and fiber placement options
3. Resin mix and metering equipment
4. Process automation enhancements and industry 4.0
5. Temperature control

Module 9: Closed Mold Quality Control (10%)

1. Procedural quality control / lean principles
2. Documentation of procedures for production
3. Processing documentation / standards / traceability
4. Digital and CAD tools for design, quality, production and simulation
5. Quality essentials, cosmetic quality
6. Controlling laminate voids and process standards