Course Objective	Competencies
1. Learn to export CAM simulations to full machine simulator	• Export fixtures to appropriate database. • Export stock models to appropriate database. • Export part models to appropriate database. • Set export coordinate systems. • Set Work Coordinate System names and numbers. • Simulate to detect collisions and undesirable cutting conditions.
2. Discuss how to set up a CNC machine to replicate the coordinate system created in the cam software	• Set work offsets to agree with graphics screen • Read program comments to ensure the part is set up correctly
3. Demonstrate an understanding of CAM basics	• Interact with the screen and menu layout for the CAM software. • Discuss the file structure for CAM software. • Discuss how CAD, CNC, and CAM relate. • Perform screen manipulation (zoom, pan, etc…)
4. Perform CAD/CAM integration (2D Applications)	• Import solid models and create edge curves. • Create levels and colors. • Translate CAD geometry to the proper CAM origin.
5. Prepare of manufacturing (3D Applications- Solids)	• Transform solids into the proper plane for machining. • Verify solid is at the proper XYZ origin. • Create additional profile features as required.

6. Perform milling operations on solid models	• Discuss chaining options and where each is appropriate. • Understand the difference between climb and conventional milling. • Select toolpaths to optimize metal removal rates. • Discuss roughing versus finishing toolpaths. • Understand types of cutter compensation and their implications at the machine.
7. Perform turning operations on solid models	• Perform face operations. • Perform OD and ID turn operations. • Perform groove operations. • Perform OD and ID threading. • Perform successful tool changes to avoid collisions. • Demonstrate how to successfully part off.
8. Discuss machining theory	• Demonstrate best practices for removing material without damaging tools and/or creating projectiles. • Experiment with different toolpaths to determine optimum cycle time. • Discuss implication of tolerances on manufacturing process. • Discuss cutting speeds and feeds is applied to different toolpaths.
9. Discuss manufacturing processes for different types of holes	• Standard blind/ through hole. • Precision blind/ through hole. • Tapped blind/ through hole. • Counter-bored blind/ through hole.

10. Generate G Code using CAM software	• Discuss industry standard terminology contained in a CNC program • Identify key "words" in the CNC code and describe their function • Identify areas of the gcode that could cause a machine crash
11. Use graphical simulators to verify part quality and detect collisions	• Simulate toolpaths using backplot (without stock removal) • Simulate toolpaths using solid simulator (with stock removal) • Identify and avoid collisions with part and fixtures