Machining Course (2-day Training) - Schedule

Day 1

09:00 - 10:30	• Orthogonal Cutting Model
	• Establishing Material Database with Orthogonal Tests
	  - Mechanistic modeling
	  - Orthogonal cutting parameter identification
	• Oblique Cutting Model

10:30 - 10:45	**Coffee Break**

10:45 - 12:15	• Establishing Material Database for Oblique Cutting
	  - Milling cutter calibration
	  - Orthogonal to oblique transformation (generalized material database)
	• Fundamentals of Turning and Milling
	  - Cutting forces
	  - Tooth passing frequency

12:15 - 13:15	**Lunch Break**

13:15 - 14:45	• Form errors
	  - Static deflection
	  - Over/Under cut in milling
	• Introduction to Vibrations: natural frequency, stiffness, damping
	• Machine Tool Dynamics and Tap Testing
	  - Example: Identification of Modal Parameters

14:45 - 15:00	**Coffee Break**

15:00 - 17:00	• Experimental Modal Analysis
	• Receptance Coupling
	  - FRF identification for long and slender tools
	  - Spindle dynamics identification

Day 2

09:00 - 10:30	• Chatter Vibrations in Metal Cutting • Forced Vibrations and Surface Location Errors - Thin blade example - Y direction flexibility only, point out what happens to form errors when forced vibration occurs around natural frequency vs not close to natural frequency
10:30 - 10:45	**Coffee Break**
10:45 - 12:15	• Pre-process Planning: selection of optimum cutting conditions for CAM • Chatter Vibration Diagnosis and Avoidance - Analytical Stability Lobes - Time Domain Analysis of Stable and Unstable Cuts (with animation data) - Radial vs Axial Stability Chart at Fixed Cutting Speed
12:15 - 13:15	**Lunch Break**
13:15 - 14:45	• NC Program Simulation - Physics-based analysis of tool paths - Machining outputs
14:45 - 15:00	**Coffee Break**
15:00 - 17:00	• NC Program Optimization - Objectives - Definition of basic constraints - Setting up optimization constraints