Module Content

Module #1 Understanding Milk
Overview of chemistry and composition of milk including milk from other animal species. Structure of milk and function of components such as water, fat, protein, lactose, minerals and enzymes. Basic properties of milk such as pH, titratable acidity, freezing point and denaturation.

Module #2 Dairy Microbiology, Testing and Equipment 101
Overview of coliforms, yeasts, molds, spores, pathogens and biofilms and their importance in dairy manufacturing. Testing milk for composition and microorganisms. Stainless steel and passivation and other metals used in dairy plants. Equipment such as pumps, motors and heat exchangers covered.

Module #3 Processing Equipment
Equipment used in processing dairy products including centrifuges, homogenizers, pasteurizers, membrane systems, evaporators and spray dryers.

Module #4 Milk Quality from Farm to Plant
Farm impacts on milk quality including cleaning farm milking systems, cooling milk and sanitizing bulk tanks. Testing requirements for milk received from farms and milk hauler requirements. Dairy plant requirements for construction, pest control, lighting, etc. Overview of Dairy Farm and Dairy Plant regulations.

Module #5 Food Safety and Sanitation
Safety systems and regulations such as Good Manufacturing Practices, Safe Quality Foods, Pasteurized Milk Ordinance and Code of Federal Regulations. Inspections, audits and environmental sampling. Sanitation and cleaning procedures and requirements. Types of cleaners and sanitizers.

Module #6 Production of Cheese
Concepts of cheese manufacture such as distribution of milk solids, cheese yield and milk standardization. Basic steps in manufacture of cheese including heat treatments, starter, bacteriophage, casein and gel formation, separating curds and whey and salting. Basic types of cheeses such as mozzarella, eyed and milled cheeses.

Module #7 Cheese Ripening and Defects
Changes that occur during ripening and why. Categories of aged cheeses include naturally aged cheeses, lipase aged cheeses, smeared ripened cheeses and mold ripened cheeses. Common defects and source of the problem.

Module #8 Production of Dairy Ingredients
Basic manufacturing processes for dairy ingredients such as nonfat dry milk, milk protein concentrates, whey, whey protein concentrates, whey protein isolate, lactose and permeate.

Module #9 Functionality and Applications of Dairy Ingredients
Functional properties such as emulsification, gelation, foaming, solubility, and heat stability of milk and whey ingredients such as sweet whey, whey protein concentrate, whey protein isolate, nonfat dry milk, milk protein concentrate, milk protein isolate, and permeate. Typical applications for dairy ingredients.

Module #10 Production of Other Dairy Products
Fluid milk, butter, ice cream and cultured products. Cultured products include yogurt, and kefir. Production flow diagrams, from incoming milk through finished product and byproducts.