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. Physical properties of milk such as pH, titratable acidity and freezing point.

Module #2 Dairy Microbiology, Testing and Equipment 101
Overview of coliforms, yeasts, molds, spores and pathogens and their importance in dairy manufacturing. Why biofilms are important. Equipment such as pumps, valves, heat exchangers and support systems discussed.

Module #3 Processing Equipment
Equipment used in processing dairy products including centrifuges, homogenizers, pasteurizers, membrane systems, evaporators and spray dryers covered. Effect of processes on the components in milk.

Module #4 Milk Quality from Farm to Plant
Emphasis on how the farm impacts milk quality including cleaning of farm milking systems, cooling milk and sanitizing bulk tanks. Testing requirements for milk received from farms also covered. Includes an overview of Dairy Farm and Dairy Plant regulations in Wisconsin and US.

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 covered. Inspections, audits and environmental sampling. Sanitation and cleaning procedures and requirements. Types of cleaners and sanitizers.

Module #6 Understanding Dairy Ingredients
The manufacture 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 others will be covered. Dairy Ingredient composition and the functional properties such as emulsification, gelation, foaming, solubility, and heat stability will be introduced.

Module #7 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.

Module #8 Production of Cheese
Basic concepts of cheese manufacture. Steps from farm to final cheese include: milk quality from farm; standardization; pasteurization; curing and ripening. Make procedures for basic types of cheese. Classification of cheeses and legal requirements. Basic production of processed cheese and cold pack.

Module #9 Ripening, Defects, Converting and Packaging
Changes that occur during ripening and why. Flavor standards for nonripened and aged cheeses. 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. Issues with machinability and conversion. Problems occurring at retail. Function of packaging, materials, quality and safety. Types of coating that may be used.

Module #10 Production and Handling of Whey
Whey process whey? Types and options for whey use. Basic properties of whey including functionality of components. Basic whey processing, whey protein concentrate, whey protein isolate and permeate production processes discussed.