Ultrafiltration Membrane Separation Educational Pilot Plant

Item Number: LPK-CLMFL

Introduction

This ultrafiltration membrane separation educational pilot plant enables undergraduate students to process PVA solutions, study hollow fiber membrane dynamics, and perform quantitative analysis with spectrophotometry for hands-on learning of unit operations and industrial maintenance and membrane cleaning protocols.

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Module / Component	Technical Description	Aligned Academic Concept
Membrane Module	Hollow fiber ultrafiltration membrane module	Membrane geometry, pore size distribution, and hollow fiber bundle mechanics.
Feed System	Polyvinyl Alcohol (PVA) feed preparation tank with corrosion-resistant circulation pump	Feed solution preparation, fluid transport, and system flow control.
Instrumentation	Precision flow meters, pressure gauges, and temperature indicators	Process monitoring, sensor calibration, and data acquisition.
Analytical Unit	Integrated UV-Vis Spectrophotometer compatibility for concentration measurement	Spectrophotometric analysis, calibration curves, and concentration determination.
Cleaning System	Backwash and chemical cleaning circuit with dedicated storage	Membrane fouling, cake layer formation, and chemical cleaning protocols.
Experimental Utility	Continuous operation mode with recycling capabilities	Steady-state operation, mass balance, and process optimization.