

ID	Name	Instructor	Description
B_1a	Intro_Centrifugal Pump Terminology	Anthony Genovese & Scott Johnston	Discussion of pump terminology, fluid statics, specific gravity, head vs. pressure, fluid dynamics, energy, the Bernoulli equation, head losses, minor losses, viscosity, system curves and equations, suction and discharge, static and dynamic heads. Content is intended for those who are new to centrifugal pumps.
B_1b	Intro_Centrifugal Pump Systems	James Priester & Jay McFarland	Introductory level discussion of displacement, various parts of the pump, performance curves, speed, efficiency, impeller trimming, parallel pumping, series pumping, and affinity laws. Content is intended for those who are new to centrifugal pumps.
B_1c	Intro_Net Positive Suction Head - Available / Required	Carnes & RJ Gates	Discussion of NPSH, vapor binding, forces of cavitation, NPSHA & NPSHR, open system suction lift, and saturated systems. Content is intended for those who are new to centrifugal pumps.
B_2	Intro_Centrifugal Pump Construction	Chris Skintges & Jay McFarland	Discussion of impellers types, shafts, bearings, seals and packing, casings, couplings, and drivers. Learn what materials are used in various applications. Content is intended for those who are new to centrifugal pumps.
B_3	Start-up Fundamentals	Simon Ruffles	What are the top 16 things you need to do before, during and start-up? Walk through the checks and procedures that will make for a successful and safe start-up.
B_4	Field Testing Practices	Troy Buzzell & Josh Standridge	Discussion of complete and appropriate field testing practices for pump in mechanical, electric, and hydraulic settings.
B_5	Installation Practices	Nick Westerberg	The reliability of a piece of rotating equipment is directly related to installation practice. Nick Westerberg presents the top causes of pumping system failure, causes of misalignment, the importance of insuring a correct foundation for fixed. Nick explains why alignment is critical to pump wear and covers lip seals, bearing life as well as lubrication. Installation basics such as pipe elbows, suction piping and concentric reducers are also covered.
B_6	Midlevel Pump Systems	Bill Barrett & Andrew Brogden	Discussion of displacement, various parts of the pump, performance curves, speed, efficiency, impeller trimming, parallel pumping, series pumping, and affinity laws. Content is intended for those who are have some experience with centrifugal pumps.

<b>Classroom Training</b>		
ID	Name	Description
M_1	Troubleshooting Centrifugal Pumps Simon Ruffles	Discussion of various techniques for troubleshooting pump problems. Covers issues with rotation, Head and B.H.P, Symptoms and causes of failures, approaches for addressing mechanical problems and system problems. Also, this course addresses conversions and corrections, and temperature sensing locations.
M_2	Vibration Analysis Ralph Cuppoletti	This course covers the "Fabulous Four Problems" and how to both identify and avoid issues with each of them. The Fabulous Four Problems are Imbalance, mechanical looseness, alignment, and bearings.
M_3	Efficiency/Energy Savings Nick Westerberg	This workshop covers the ultimate question of efficiency. Using performance curves combined with practical examples and scenarios, this course explains how to test for pumping system efficiency in order to identify potential energy savings.
M_4	Pumpflo Training Andrew Brogden & Steve McCormick (PumpFlo)	PUMP-FLO is a web-based tool that end users and distributors use to select the right pump for their application conditions. Learn how to run a Basic Design Point Search to find the right pump based on actual or theoretical application requirements. Users can access all of the pump performance curves in the Pioneer Pump Catalog. Input their application requirements in terms of flow and head and search by pump types and speeds. The class will also cover the printed report options as well as advanced search criteria.
M_5	Application & Selection Nick Westerberg	Discussion of specie gravity, viscosity, the orifice flow chart, temperature, vapor pressure, properties of water, cavitation, forces acting on the impeller, PH, corrosive quality, coke, velocity, PVC pipe, water hammer solutions, solids handling, strainer size, pressure, head in feet, gauge placement and troubleshooting, identifying potential problems, friction loss, suction calculation, curve explanation,
M_6	Preventative Maintenance/Service Troy Buzzell	Learn what and when preventative maintenance should be done to keep the pump running at top performance. Class will include service checklist, steps for diagnosing the priming system and information on wear parts.
M_7	VFD Controls Tommy Trolling & Anthony Genovese	Class covers drive basics, applications and specifications. Learn common setup routines, including quick start and basic programming.

<b>Demonstrations</b>			
Demonstrations will run during multiple sessions so that participants will have the opportunity to attend all of the demos.			
ID	Name		Description
D1	Pump Testing Demonstration	Bill Carnes	Using the pump test set-up, Bill Carnes will demonstrate how a pump head/capacity curve is derived, what does cavitation sound like, troubleshooting basic pump performance problems.
D3	Assembly Demonstration	Dave Lazott / Lonnie Loyer	Details of how to assemble the pump, the tricks of installing mechanical seals, bearings on shafts, sleeves, packing
D4	Diesel Start-up Demo	Jay/Chris	The diesel package has been delivered to the worksite, now what? Learn how to prime the pump, prime the fuel, set speeds to run, and troubleshoot basic set-up issues.
D2	Lift, Demonstrating Priming System Demo	Josh/Andrew	Why does 50 CFM matter? How much difference is there between venturi primed and vacuum primed systems? This demonstration will show how each method works.
D5	Laser Alignment, Fixed Installation Demo	Nick Westerberg	For fixed pump installation, the stability and construction of the base will greatly influence the wear and service of the pump. Nick Westerberg will demonstrate what to watch for. He will also demonstrate how to accomplish a laser alignment during installation.