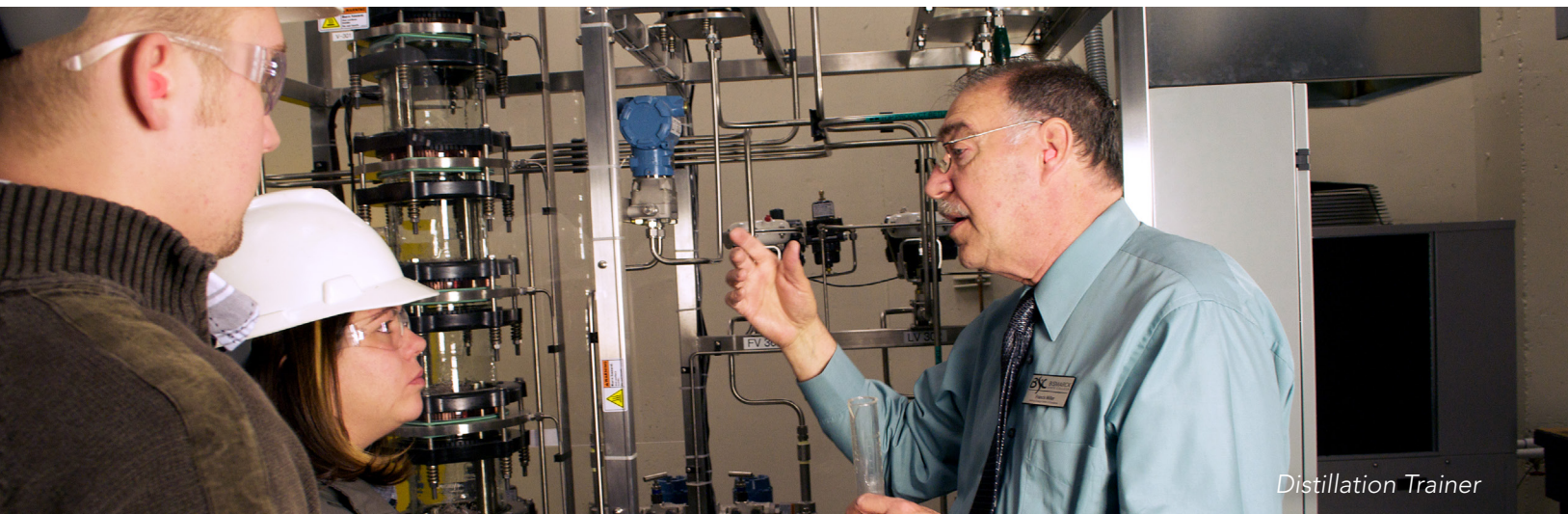


LAB EQUIPMENT LIST

BISMARCK STATE COLLEGE
National Energy Center of Excellence (NECE)

Bismarck State College's National Energy Center of Excellence uses the following equipment, simulation systems and process training systems through its college credit programs. This equipment, instruction and customized training options are also available for non-credit industry training.

EQUIPMENT	DESCRIPTION	PROGRAM(S)
Backhoe	Practice backhoe operation digging trenches, backfilling and moving soil as needed associated with installing, repairing and maintaining underground utilities.	Lineworker
Biodiesel Production Trainer	Operate a biodiesel production unit via PLC control system to produce industry grade biodiesel and associated byproducts.	Process Plant
Computer Based Simulation Training	Simulation training modules covering the following topics: Chemical Processing, Distillation Column Process, Centrifugal Compressor, Superheated Steam Boiler, Multi-Element Control Process and Amine Treating Unit, Fluid Catalytic Cracking Unit, Atmospheric Distillation Unit / Crude Tower and Ethanol Plant.	Power Plant, Process Plant
Confined Space Trainer	Provides an opportunity to study and practice confined space pre-checks, entry and emergency retrieval of an unconscious individual. Trainer was built with portability in mind and comes via a flatbed trailer.	Mechanical Maintenance, Power Plant, Process Plant
Controllers	Provides a platform to study single loop controllers primarily Honeywell UDC 3500	Instrumentation & Control
Control Loop Trainers	Identify control loop equipment, process flows, and control loop functions while completing hands-on control loop setup and configurations.	Power Plant, Process Plant, Renewable Generation
Digger Derrick Trucks	Provides manual and/or remote operation of digger derrick units used in the lineworker industry associated with the drilling and placement of electrical distribution poles.	Lineworker
Distillation Trainers	Learn distillation fundamentals from startup to shut down through the use of small manual control distillation trainers and/or an 8' tall distillation tower controlled by an Emerson Delta-V control system. Trainers are equipped with clear acrylic or glass where possible to show inner workings of the towers and systems.	Process Plant
Electrical Circuit Trainers	Provides a platform to apply basic electrical fundamentals, electrical motor circuit and resistive load configurations, troubleshooting and analysis.	Power Plant, Process Plant, Renewable Generation
Fire Fighting Training Systems	Hands-on use of fire extinguishers and techniques involved fighting various real fire scenarios outdoors and/or through simulated conditions via a laser driven digital fire training system that can be used indoors.	Power Plant, Process Plant
Hydraulic and Pneumatic Trainers	Provides a platform to apply fluid power technologies, electro-hydraulic systems, pneumatic systems, valves, lines, controls and cylinders along with troubleshooting scenarios.	Mechanical Maintenance, Renewable Generation
Lathe	Provides a platform in which it rotates the workpiece on its axis to do various operations, such as: cutting, drilling, facing and turning.	Mechanical Maintenance
Level and Flow Process Control System Trainers	Learn about process variables with a focus on two of the most common; fluid flow and liquid level. Practice how to calibrate, adjust, install, operate, and connect process control systems in industrial applications.	Instrumentation & Control, Renewable Generation, Power Plant, Process Plant
Lock Out – Tag Out Trainers	Provides a platform to apply lock-out tag-out processes and perform compliance checks utilizing various electrical and process system trainers.	Power Plant, Process Plant, Renewable Generation



Distillation Trainer

Mechanical Drive System Trainers	Provides a platform using different sized gears, shafts and drives to mount, connect, balance and align drivers to driven pieces of equipment.	Mechanical Maintenance, Power Plant, Process Plant, Renewable Generation
Milling Machines with Rotary Machining Tables	Practice the machining of parts and tools to precise sizes and shapes by cutting or drilling around fixed horizontal or vertical axis.	Mechanical Maintenance
Motor Control Trainers	A detailed look at electric relay control of AC electric motors and variable frequency drives (VFDs) found in industrial, commercial, and residential applications. Learn how to operate, install, design, and troubleshoot AC electric motor control circuits for various applications.	Instrumentation & Control, Renewable Generation
Motor-Generator Sets	Provides a basic platform to apply electrical motor-generator circuit configuration, troubleshooting and analysis.	Renewable Generation
Pipe Beveling Machine	Provides an opportunity to become proficient beveling boiler tubes and pipe to various degree's offering practice and test coupons using GTAW and the SMAW processes.	Mechanical Maintenance
Pipe Fittings Lab	Learn to identify, properly assemble, pressurize, bleed and safely check common pipe fitting systems used in the energy industry.	Power Plant, Process Plant, Renewable Generation
Pipeline Pigging Demonstrator	Provides a platform to apply pigging exercises and view the operation of pigging through an acrylic pipeline system. An up-close look at the types of pigs, pigging launchers, receivers and pigging procedures.	Power Plant, Process Plant
Positioners	An up-close look and study on how positioners function automatically including the use of Fisher 3582i, DVC 5010, DVC 6010 and DVC 6200.	Instrumentation & Control
Pressure Gauges	Provides a platform to study and utilize Wika Digital PSI gauges and CeComp Electronics in H2O gauges.	Instrumentation & Control
Pressure Switches	Learn about the various mechanical pressure switches common throughout the energy industry.	Instrumentation & Control
Print Reading	Hands-on practice utilizing various trainers and systems to trace process flows, control loops, equipment symbols, electrical systems etc. found on piping and instrumentation diagrams (P&IDs), electrical drawings and other prints.	Instrumentation & Control, Mechanical Maintenance, Renewable Generation, Power Plant, Process Plant
Process Meters/DMM	Provides an avenue to study and use various units including; Fluke 789, Fluke 725, Fluke 718, Fluke 771, AmpProbe 30XR-A, Altek 334a and Wika Wally Box 65-2000.	Instrumentation & Control, Renewable Generation
Programmable Logic Controller (PLC) Trainers	Introduces participants to the use of Allen Bradley 5000 PLCs and HMIs (Human Machine Interface). The PLC is a purpose built machine control computer designed to read digital and analog inputs from various sensors, execute a user defined logic program, and write the resulting digital and analog output values to various output elements like hydraulic and pneumatic actuators, indicator lamps, solenoid coils, networking, etc.	Instrumentation & Control, Renewable Generation



Pumps and Valves	An upfront and detailed look at different pumps and valves using cut-always and clear acrylic visual models. Learn about pump and valve designs, their applications, maintenance and their operation.	Mechanical Maintenance, Renewable Generation, Power Plant, Process Plant
Pump Maintenance Trainers	Provides hands-on mechanical training on maintaining and preparing screw pumps, gear pumps, diaphragm pumps and centrifugal pumps.	Mechanical Maintenance
Pump Trainers (Centrifugal)	Provides an avenue to study centrifugal pump operation including an upfront and visible view of pump cavitation, the effect of the variation in static head and piping configuration on flow and pressure, as well as fundamental basic operational principles.	Power Plant, Process Plant
Pump Trainers (Dynamic)	Compare and contrast a set of dynamic and positive displacement pumps through a series of exercises, including the verification of proper valve alignment, start-up, operation/monitoring and shut down. Students will examine the concepts of suction head pressure and determine the results to which create cavitation and vapor lock.	Power Plant, Process Plant
Semi-Tractor Trailer	Provides students with hands-on experience driving a semi equipped with a flatbed trailer in preparation for their commercial driving license (NDDOT Class A).	Lineworker
Semi-Tractor Trailer Simulators	Use of semi-tractor trailer driving simulators that provide hands-on practice driving with variable loads, shifted loads, weather conditions, road conditions and traffic conditions. Aids students in preparation for their commercial driving license (NDDOT Class A).	Lineworker
Shaft Alignment Trainer	Provides an opportunity to use dial indicators, reverse alignment and laser alignment systems.	Mechanical Maintenance, Renewable Generation
Skid Steer	Practice safe skid steer operation and the use of auger, tamper and pole setting attachments as used in the electric power industry.	Lineworker
Solar Panel Trainers	Provides a basic platform to apply electrical solar collector panel theory and practical field applications.	Renewable Generation
Solenoids	Learn how solenoids function and their practical applications through the use of Asco solenoids.	Instrumentation & Control
Soot Blower	Learn the uses, types and components that make up a typical soot blower. Demonstrate the operation of a retractable soot blower and an upfront look at the maintenance needs associated with gear boxes, packing and overall unit maintenance.	Mechanical Maintenance, Power Plant
Steam Trap Trainer	A comprehensive look at steam trap styles, operation, efficiency and safety. Through the use of a steam source and glass viewing windows, the internal workings of an inverted bucket, thermostatic, and float & thermostatic trap can be observed.	Power Plant, Process Plant



Temperature Process Control Trainers	Provides a platform to study flow, heating, cooling, and heat transfer. Learn to calibrate, adjust, install, operate, and connect thermal process control systems used in industrial applications.	Instrumentation & Control, Renewable Generation, Power Plant, Process Plant
Thermal Power Generation Hard Panel Simulators	Provides an opportunity to interact and manipulate process variables associated with a drum-type controlled circulation, pulverized coal boiler that simulates conditions involved with going from a cold start-up to full load of 600 megawatts.	Power Plant, Process Plant
Thermal Power Generation Unit	Operation of a miniature power plant including a natural gas fired, 150# water tube boiler and a single stage turbine/generator set from pre-start to full-load to shut down utilizing an Emerson Ovation distributive control system.	Power Plant, Process Plant
Thermal Power Plant Coal Fired Simulators with Distributive Control Systems (DCS)	Operation of a single unit, pulverized coal fired power plant including boiler operation, power generation and grid synchronization. Distributive control systems include Honeywell TDC 3000 equipped with a Mark V RSI turbine control system and/or a Honeywell Experion equipped with a Mark VI RSI turbine control system.	Power Plant
Three Phase Separators	A comprehensive look at three phase separation via clear acrylic horizontal and vertical small scale vessels that perform continuous separation of a mixture of oil, air and water to emulate a crude oil stream.	Power Plant, Process Plant
Transformer Trainer	Provides a platform to study transformers and transformer connections including single phase, B phase, and three phase transformers.	Lineworker
Transmitters	Products used and studied include Yamatake, Yokogawa, Rosemount, Honeywell and HART Communicators – 475 Communicator, 275 Communicator, and AMS Device Manager Software.	Instrumentation & Control
Trencher	Provides an opportunity to dig a trench, lay, mark, backfill and bury cable as associate with underground utilities.	Lineworker
Valve Packing Lab	Discover the various types of packing, its purpose and the appropriate use for different applications. Practice safely removing and installing packing on valves using the appropriate tools.	Mechanical Maintenance, Power Plant, Process Plant, Renewable Generation
Valves/Actuators	Provides a basic understanding of the automatic operation of valves including the use of Fisher Valve Type EZ and ED; Actuator 667 and 657 and also Valtek/Flowserve MK1.	Instrumentation & Control
Welding (Square Wave Lincoln 350)	Practice the use of pulse capabilities to weld aluminum wire feed with a push/pull gun in all positions.	Mechanical Maintenance
Welding (Synchro Wave Millermatic 350)	Practice with water cooled AC/DC welding machines with capabilities to GTAW weld aluminum in all positions.	Mechanical Maintenance
Wind Tower	Provides a basic platform to apply rigging and rescue skills, as well as climb assist, confined space and maintenance practices using a short 20' tall section of a typical wind tower.	Renewable Generation