4TH CLASS POWER ENGINEERING COURSE SUMMARIES

COURSE PEN3020: PREPARATORY MATH

Students will demonstrate fundamental mathematical concepts and skills required to perform calculations and computations.
***Prerequisite**: None*

COURSE PEN3021: ELEMENTARY MECHANICS AND DYNAMICS

Students will be able to solve problems related to force, work, pressure, stress and friction.
***Prerequisite**: None*

COURSE PEN3022: CHEMISTRY AND THERMODYNAMICS

Students will be able to describe and define physical and chemical systems and explain how atoms and molecules combine to form compounds, mixtures and solutions. They will be able to apply thermodynamic principles to determine the state of a working fluid and describe how its properties (e.g., temperature, pressure, specific volume and enthalpy) explain its behaviour in specific processes.
***Prerequisite**: None*

COURSE PEN3023: POWER ENGINEERING GOVERNANCE

Students will be able to describe the profession of the power engineer and the importance of jurisdictional regulations, codes and standards.
***Prerequisite**: None*

COURSE PEN3024: PLANT AND FIRE SAFETY

Students will be able to describe the elements of maintaining a safe work environment, including fire safety and using and maintaining fire extinguishing equipment.
***Prerequisite**: None*

COURSE PEN3025: ENVIRONMENTAL IMPACT

Students will be able to identify environmental considerations for reducing or eliminating energy plant emissions.
***Prerequisite**: None*

COURSE PEN3026: MATERIAL SCIENCE AND WELDING

Students will be able to describe properties of engineering materials, as well as welding processes and testing methods.
***Prerequisite**: None*

COURSE PEN3027: FLUID-HANDLING TECHNOLOGY

Students will be able to describe piping materials and methods, as well as the design, use and maintenance of valves.
***Prerequisite**: None*

COURSE PEN3028: ELECTROTECHNOLOGY

Students will be able to apply the concepts of basic electricity and magnetism to the operation of AC and DC motors, generators and transformers. Students will be able to describe the power distribution system used for power plant operation.
***Prerequisite**: None*

COURSE PEN3029: INSTRUMENTATION AND CONTROLS

Students will be able to describe the purpose, function and operation of energy plant instrumentation systems.
***Prerequisite**: None*

COURSE PEN3030: INDUSTRIAL COMMUNICATION

Students will be able to interpret and sketch plant drawings and diagrams.
***Prerequisite**: None*

COURSE PEN3031: BOILER DESIGNS

Students will be able to describe the design, components, construction, characteristics and operation of various types of boilers.
***Prerequisite**: None*

COURSE PEN3032: BOILER SYSTEMS

Students will be able to describe the systems used in the operation and maintenance of boiler systems (e.g., combustion, fuel, draft, feedwater, blowoff and blowdown and fireside cleaning).
***Prerequisite**: None*

COURSE PEN3033: LUBRICATION AND BEARINGS

Students will be able to describe the purpose and properties of lubrication for the maintenance and care of bearing systems.
***Prerequisite**: None*

COURSE PEN3034: PUMPS AND COMPRESSORS

Students will be able to describe the operation and maintenance of various types of pumps and compressors used in power plants.
***Prerequisite**: None*

COURSE PEN3035: BOILER SAFETY DEVICES

Students will be able to describe the safety requirements, equipment and controls related to the safe operation of boilers.
***Prerequisite**: None*

COURSE PEN3036: BOILER PLANT OPERATION AND MANAGEMENT

Students will be able to describe the operational procedures for start-up, operation, management and shutdown of boiler plant systems.
***Prerequisite**: None*

COURSE PEN3037: ENERGY PLANT MAINTENANCE

Students will be able to describe the use of hand tools and hoisting and rigging equipment, as well as boiler equipment service, maintenance and cleaning methods.
***Prerequisite**: None*

COURSE PEN3038: IN-PLANT WATER TREATMENT

Students will be able to describe water treatment principles, methods and equipment used in an energy plant.
***Prerequisite**: None*

COURSE PEN3039: PRIME MOVERS AND HEAT ENGINES

Students will be able to describe the conversion of heat energy into mechanical energy and the use and operation of steam and gas turbines, condensers and cooling towers and combustion engines in an energy plant.
***Prerequisite**: None*

COURSE PEN3040: AUXILIARY BUILDING SYSTEMS

Students will be able to describe various lighting systems, water supply systems and drainage systems used in energy facilities.
***Prerequisite**: None*

COURSE PEN3041: REFRIGERATION

Students will be able to explain refrigeration, the properties of refrigerants and the operation and the maintenance of compression and absorption refrigeration systems.
***Prerequisite**: None*

COURSE PEN3042: HEATING, VENTILATING AND AIR CONDITIONING

Students will be able to describe methods for air distribution, conditioning and humidification used in buildings and energy plants.
***Prerequisite**: None*

COURSE PEN3043: ENVIRONMENTAL AND CONTROL SYSTEMS

Students will be able to describe the operation and maintenance of different types of heating systems used in buildings and energy plants.
***Prerequisite**: None*

COURSE PEN3044: INDUSTRIAL PLANT CONFIGURATIONS

Students will be able to identify steam-related processes employed by hydrocarbon-centric and common industrial plants.
***Prerequisite**: None*

COURSE PEN3605: PEN PRACTICUM 4A

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.
***Prerequisite**: None*

COURSE PEN3610: PEN PRACTICUM 4B

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.
***Prerequisite**: None*

COURSE PEN3615: PEN PRACTICUM 4C

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.
***Prerequisite**: None*

COURSE PEN3620: PEN PRACTICUM 4D

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.
***Prerequisite**: None*