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COLLEGE OF ENGINEERING

CHEMICAL AND WATER DESALINATION ENGINEERING

Chemical And Water Desalination Engineering Laboratories

Lab Name	Location	Person in Charge	Programs Served	Courses Served
Water Chemistry and Analysis Lab	W12-014	Mohammed Ali	Chemical And Water Desalination Engineering	- Water Chemistry and Analysis
Chemical Thermodynamics Lab	W12-131	Mohammed Ali	Chemical And Water Desalination Engineering	- Chemical Thermodynamics
Applied Fluid Mechanics Lab	W12-131	Mohammed Ali	Chemical And Water Desalination Engineering	- Applied Fluid Mechanics

Chemical And Water Desalination Engineering Lab Staff

#	Name	Title	Ext.	Email
1	Mohammed Ali	Laboratory Engineer	065053495	Mohammed.Ali@sharjah.ac.ae

WATER CHEMISTRY AND ANALYSIS LABORATORY



Location	Lab Staff in Charge	Contacts
W12-014	Mohammed Ali	065053495

INTRODUCTION

This laboratory has been established to apply chemical equilibrium principles for: acids-bases reactions, dissolution-precipitation reactions, oxidation-reduction reactions, and complexation reactions to understand the chemistry of surface waters, ground waters, and water and wastewater treatment.

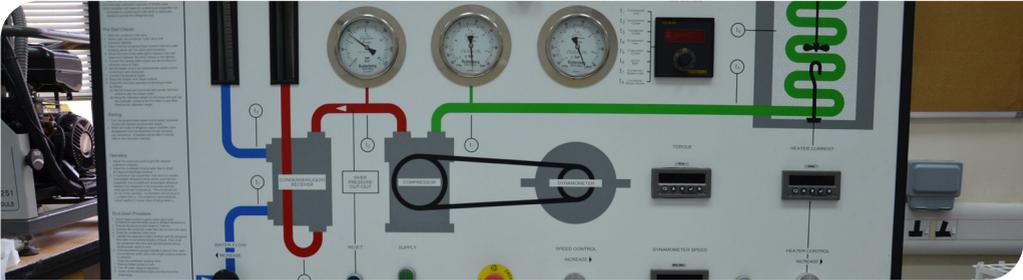
EQUIPMENT AND INSTRUMENTS

- Ion Chromatography for Water Applications.
- Inductively coupled plasma-mass spectroscopy for Water Applications.
- Total Organic Carbon Analyzer.
- UV Spectroscopy for Water Applications.
- Chemical Oxygen Demand Analyzer.
- Biochemical Oxygen Demand Analyzer.
- pH, Conductivity, Salinity and TDS Analyzers.
- Jar Test: Coagulation and flocculation processes.
- Turbidity Meter.
- ORP Meter.

EXPERIMENTS

- Qualitative and quantitative anions and cations analysis.
- Qualitative and quantitative heavy metals analysis.
- Total Inorganic and Organic Carbon analysis.
- Chemical Oxygen Demand determination.
- Biochemical Oxygen Demand determination.
- Determination the optimum coagulant dosage for clarifying different types of water.
- Determination of the Physical properties (conductivity, salinity, turbidity).
- Solid Analysis (TS, TDS, TSS, TFS, TVS).

CHEMICAL THERMODYNAMICS LABORATORY



Location	Lab Staff in Charge	Contacts
W12-131	Mohammed Ali	065053495

INTRODUCTION

This laboratory has been established to conduct chemical thermodynamics fundamental concepts experiments that will help the student during their study of the different desalination processes. These experiments include: relation between pressure and temperature of Marcet Boiler, study of different temperature measuring devices, measuring the air humidity and changes the state of the gases as well as the phase change, measurement of heat capacity and thermal conductivity of solid, liquid and gas determine the power input, heat output and coefficient of a vapor compression cycle in Mechanical Heat Pump, Study of a gas turbine operation demonstration of its different components

EQUIPMENT AND INSTRUMENTS

- Thermal equation of state and critical point Unit.
- Steam Engine Unit.
- Temperature Measurement & Calibration Unit
- Pressure Measurement & Calibration Unit.
- Saturation Pressure & Throttling Calorimeter Unit.
- Expansion Processes of a Perfect Gas Unit.
- Conductivity of Liquids and Gases Unit.
- Equation of state for ideal gases experiment Unit.

EXPERIMENTS

- Investigating the reference PRT equation and the use of correction equations.
- Utilizing a heated water-bath and an enclosed body of air to investigate the effect of a temperature differential between temperature sensors and the body being measured.
- Examining the thermoelectric properties of thermistor and thermocouple devices.
- Investigating the behavior and operation of a Bourdon gauge and Deadweight Pressure

Calibrator.

- Proving Boyle's law that absolute pressure and volume are inversely related at constant temperature.
- Studying the behavior of water during the transition between liquid and vapor phases.
- Studying the change in vapor point with increasing pressures and to watch the fluid behavior using a sight glass set into a pressure vessel.
- Measure the saturation pressure of water using a pressurized vessel.
- Studying the adiabatic reversible process (isentropic expansion).
- Studying the behavior of a perfect gas and its describing equations.
- Understanding the use of the Fourier rate equation in determining the rate of heat flow by conduction through liquids or gases.
- Measuring the constant of proportionality (the thermal conductivity k) of different liquids such as water and glycerin.

APPLIED FLUID MECHANICS LABORATORY



Location	Lab Staff in Charge	Contacts
W12-131	Mohammed Ali	065053495

INTRODUCTION

The lab demonstrates experimentally the basic concepts of flow behavior, fluid forces and analysis tools through different systems. The experiments includes: Measurement of Viscosity, Density and Specific Gravity of Fluids Calibration of Pressure Gages, Hydrostatic Forces Experiment, Reynolds pipe flow: laminar flow, transition to turbulence, and turbulence, Verification of Bernoulli's theorem, Fluid Flow Visualizations/ Cavitation, Water Hammer, Determination of Friction Loss along Straight Pipes, bends and elbows, Packed Bed, Fluidized Bed, Pelton turbine

EQUIPMENT AND INSTRUMENTS

- Cavitation Demonstration Unit.
- Demonstration Pelton Turbine Unit.
- Fixed and Fluidized Beds Unit.
- Flow Meter Demonstration Unit.
- Pipe Network Unit.

EXPERIMENTS

- Verification of Pascal's law.
- Hydrostatic force and center of pressure for submerged surfaces.
- Studying the cavitation phenomenon and its association with the vapor pressure of a liquid.
- Studying the Turbine Unit Performance.
- Studying the impact of jets.
- Verification of Bernoulli's Theorem.
- Studying and Determination of pressure loss in pipe networks.