



جامعة الكويت  
KUWAIT UNIVERSITY

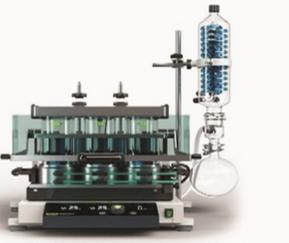
## Research Sector General Facilities & Specialized Research Units & Laboratories Science - GC Lab

اسم الجهة Institute/ Department	اسم الجهاز Equipment name	الجهة المصنعة Manufacturer	وصف موجز للجهاز Equipment Description	صورة الجهاز Equipment Photo	استخدامات الجهاز uses of equipment
SRUL 01/13 College of Science, NUERS	Gas Chromatography with Flame Ionization Detector (GC-FID)	Agilent Technologies	Aliphatic Hydrocarbon Profile and Total Petroleum Hydrocarbons can be tested By GC/FID-(C8-C40). The operation of the FID is based on the detection of ions formed during combustion of organic compounds in a hydrogen flame. The generation of these ions is proportional to the concentration of organic species in the sample gas stream.		<ol style="list-style-type: none"> <li>1. Separate and quantify hydrocarbons in petroleum industry</li> <li>2. Analyze VOCs in environmental samples for pollution monitoring</li> <li>3. Identify and quantify flavor and aroma compounds in food and beverages</li> <li>4. Analyze drug purity, identify impurities, and monitor drug degradation pathways in pharmaceutical industry</li> <li>5. Analyze arson accelerants, paint chips, and drug residues in forensic science</li> <li>6. Analyze solvents, adhesives, and other industrial chemicals</li> <li>7. Identify and quantify components of essential oils and fragrances</li> <li>8. Analyze composition of cosmetic products</li> <li>9. Analyze volatile compounds in biological samples for medical diagnosis, drug monitoring, and environmental exposure assessment</li> <li>10. Analyze organic residues on archaeological artifacts for insights into ancient cultures and their lifestyles</li> </ol>
SRUL 01/13 College of Science, NUERS	Gas chromatography with Mass Detector (GC- MS)	Shimadzu Corporation	Polycyclic Aromatic Hydrocarbons - 16 Priority Pollutant Compounds and Pesticides can be tested by GC/MS. The GC works on the principle that a mixture will separate into individual substances when heated. The heated gases are carried through a column with an inert gas (helium). As the separated substances emerge from the column opening, they flow into the MS. Mass spectrometry identifies compounds by the mass of the analyte molecule. A library of known mass spectra, covering several thousand compounds, is stored on a computer.		<ol style="list-style-type: none"> <li>1. Identify and quantify unknown compounds in mixtures.</li> <li>2. Determine the structure of organic compounds.</li> <li>3. Separate and identify a wide range of compounds in complex mixtures.</li> <li>4. Detect trace impurities in samples.</li> <li>5. Determine the isotopic composition of compounds.</li> <li>6. Analyze environmental samples for pollutants.</li> <li>7. Analyze food and beverages for contaminants and quality.</li> <li>8. Identify and characterize new drugs.</li> <li>9. Analyze paint chips and other trace evidence.</li> <li>10. Diagnose diseases and monitor therapeutic drug levels.</li> <li>11. Analyze crude oil, natural gas, and refined petroleum products.</li> <li>12. Identify and quantify components of essential oils and fragrances.</li> <li>13. Analyze the composition of cosmetic products for safety.</li> </ol>
SRUL 01/13 College of Science, NUERS	Gas Chromatograph with Electron capture detector (GC-ECD)	Thermo Scientific	With ECD, a beta emitter, radioactive <sup>63</sup> Ni is used to ionize the carrier gas. Fast beta particles generated by the radioactive source collide with the molecules of the carrier or make-up gas producing free slow-moving electrons, which generate a steady current. If the GC effluent contains organic molecules with electronegative functional groups, such as halogens, electrons will be captured, and the current will be reduced. The reduction in electron flow is proportional to the quantity of electrophile sample components. Analysis for Organochlorine pesticides, PCBs in extracts from several matrices including water, soil/sediment, and biota can be done.		<ol style="list-style-type: none"> <li>1. Detect and quantify electronegative compounds in environmental samples.</li> <li>2. Analyze pesticides, herbicides, and PCBs in environmental samples.</li> <li>3. Detect and quantify halogenated VOCs in environmental samples.</li> <li>4. Analyze food and beverage samples for contaminants and flavor compounds.</li> <li>5. Analyze pharmaceutical formulations for purity and impurities.</li> <li>6. Analyze arson accelerants, paint chips, and drug residues in forensic samples.</li> <li>7. Identify and quantify impurities and contaminants in industrial chemicals.</li> <li>8. Analyze essential oils and fragrances to identify components and ensure quality.</li> <li>9. Analyze cosmetic products for ingredients and contaminants to ensure safety.</li> <li>10. Analyze biological samples for drugs, toxins, and metabolites for medical diagnosis, drug monitoring, and environmental exposure assessment.</li> <li>11. Analyze organic residues on archaeological artifacts to gain insights into ancient cultures and lifestyles.</li> </ol>
SRUL 01/13 College of Science, NUERS	Gas chromatography with Mass Detector (GC- MS)	Agilent Technologies	The GC works on the principle that a mixture will separate into individual substances when heated. The heated gases are carried through a column with an inert gas (helium). As the separated substances emerge from the column opening, they flow into the MS. Mass spectrometry identifies compounds by the mass of the analyte molecule. A library of known mass spectra, covering several thousand compounds, is stored on a computer.		<ul style="list-style-type: none"> <li>• Identifies and quantifies unknown compounds</li> <li>• Determines the structure of organic compounds</li> <li>• Separates and identifies compounds in complex mixtures</li> <li>• Detects trace impurities in samples</li> <li>• Determines the isotopic composition of compounds</li> </ul> <p>Examples of analyses:</p> <ul style="list-style-type: none"> <li>• Environmental analysis (pollutants in air, water, and soil)</li> <li>• Food science (composition, contaminants, quality)</li> <li>• Pharmaceutical research (new drug identification, quantification, stability)</li> <li>• Forensic science (arson accelerants, paint chips, drug residues)</li> <li>• Clinical chemistry (disease diagnosis, drug level monitoring)</li> <li>• Petrochemical industry (composition of crude oil, natural gas, refined products)</li> <li>• Flavor and fragrance industry (components of essential oils and fragrances)</li> <li>• Cosmetics industry (composition, ensuring safety)</li> </ul>
SRUL 01/13 College of Science, NUERS	Ultra Pressure liquid chromatography (UPLC)	Waters	The specific intermolecular interactions between the molecules of a sample and the packing material define their time "on-column". Hence, different constituents of a sample are eluted at different times. Thereby, the separation of the sample ingredients is achieved. Analysis of Bisphenol A, NSAIDs etc can be done.		<ol style="list-style-type: none"> <li>1. Environmental analysis: Detects pollutants in air, water, and soil</li> <li>2. Food science: Analyzes composition, identifies contaminants, and assesses quality</li> <li>3. Pharmaceutical research: Identifies and characterizes new drugs, develops analytical methods, and monitors drug stability</li> <li>4. Clinical chemistry: Diagnoses diseases and monitors therapeutic drug levels</li> <li>5. Botanical and herbal analysis: Identifies and quantifies bioactive compounds</li> <li>6. Cosmetics industry: Analyzes the composition of cosmetic products to ensure safety</li> <li>7. Forensics: Analyzes biological samples for drugs, toxins, and metabolites</li> <li>8. Anti-doping analysis: Detects and quantifies banned substances in athletes' samples</li> <li>9. Materials science: Identifies and quantifies components and impurities in polymers, composites, and other materials</li> </ol>
SRUL 01/13 College of Science, NUERS	OVEN BINDER ED-23	Binder ED	The strengths of a BINDER ED series drying chamber include routine drying and sterilization tasks up to +300 °C.		<ol style="list-style-type: none"> <li>1. Soil moisture determination: Dry soil samples to a constant weight for accurate moisture content determination.</li> <li>2. Sediment analysis preparation: Dry sediment samples to preserve integrity and prevent volatile compound loss before contaminant analysis.</li> <li>3. Tissue sample preparation: Dry plant and animal tissues to preserve integrity, prevent microbial growth, and prepare for analysis.</li> <li>4. Filter drying: Dry air and water filters to preserve collected material, prevent volatile compound loss, and prepare for analysis.</li> <li>5. Glassware and equipment sterilization: Dry glassware and equipment used in environmental testing to prevent sample contamination and ensure proper cleaning.</li> </ol>

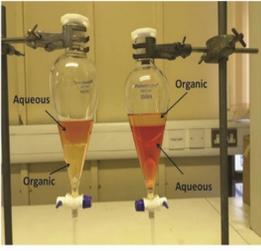


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## Research Sector General Facilities & Specialized Research Units & Laboratories Science - Extraction Lab

اسم الجهة Institute/ Department	اسم الجهاز Equipment name	الجهة المصنعة Manufacturer	وصف موجز للجهاز Equipment Description	صورة الجهاز Equipment Photo	استخدامات الجهاز uses of equipment	
SRUL01/13	College of Science, NUERS	OVEN BINDER	Binder ED	The strength of Binder series drying chamber include routine drying and sterilization tasks up to +300° C.  It is used for baking Toc soil samples and standards.		<ol style="list-style-type: none"> <li>1. Soil moisture determination: Dry soil samples to a constant weight for accurate moisture content determination.</li> <li>2. Sediment analysis preparation: Dry sediment samples to preserve integrity and prevent volatile compound loss before contaminant analysis.</li> <li>3. Tissue sample preparation: Dry plant and animal tissues to preserve integrity, prevent microbial growth, and prepare for analysis.</li> <li>4. Filter drying: Dry air and water filters to preserve collected material, prevent volatile compound loss, and prepare for analysis.</li> <li>5. Glassware and equipment sterilization: Dry glassware and equipment used in environmental testing to prevent sample contamination and ensure proper cleaning.</li> </ol>
SRUL01/13	College of Science, NUERS	MICROWAVE EXTRACTOR (MAE) MILESTONE, ETHOS SEL	MILESTONE, ETHOS SEL	Solid samples of a known weight with suitable solvent are extracted by closed vessel device utilizing microwave energy to produce an elevated temperature.		<ol style="list-style-type: none"> <li>1. Organic compound extraction: Efficiently extracts organic compounds from various matrices for analysis.</li> <li>2. Environmental contaminant analysis: Extracts pesticides, herbicides, and other contaminants from soil, water, and sediment for environmental monitoring.</li> <li>3. Food and beverage analysis: Extracts flavor and aroma compounds, identifies contaminants, and assesses food quality.</li> <li>4. Pharmaceutical analysis: Extracts drug compounds from various matrices, monitors drug stability, and aids in biomarker discovery.</li> <li>5. Cosmetics analysis: Identifies and quantifies ingredients and detects contaminants in cosmetic products.</li> <li>6. Forensic analysis: Extracts DNA and other trace evidence from forensic samples without damaging them.</li> <li>7. Anti-doping analysis: Extracts banned substances from athletes' samples for drug testing.</li> <li>8. Materials science: Extracts various compounds from materials for characterization and impurity identification.</li> </ol>
SRUL01/13	College of Science, NUERS	AUTOMATED SOLVENT EXTRACTOR- VELP SCIENTIFICA, SER 158 - HYDROLYSIS UNIT, VELP SCIENTIFICA, SER 158 WITH POLYSCIENCE CHILLER	Velp Scientifica	Minimum 2g of sample is taken in cellulose thimble that is covered by the pure solvent dripping from a reflux condenser above. From time to time the solvent with the extracted substances is reported in the extraction cup. This extractor is used for solid-liquid extraction for TPH, AHP, PAH, PCB and pesticides extraction.  This Hydrolysis Unit HU 6 is used for the sample preparation prior to solvent extraction for the determination of the total fat content, in order to free the fat molecules ready for extraction. It determine the fat content of food samples such as meat, cheese, seafood, chocolate, cereal flours.		<ol style="list-style-type: none"> <li>1. Food analysis: Determines fat content, extracts flavor and aroma compounds, and assesses pesticide and herbicide residues.</li> <li>2. Pharmaceutical analysis: Determines drug purity, identifies impurities, and extracts drug compounds.</li> <li>3. Forensic analysis: Extracts DNA and trace evidence from forensic samples.</li> <li>4. Anti-doping analysis: Extracts banned substances from athletes' samples for drug testing.</li> <li>5. Materials analysis: Extracts various compounds from materials for characterization and impurity identification.</li> <li>6. Hydrolysis Unit: Hydrolyzes fats, proteins, and carbohydrates for composition analysis and contaminant detection.</li> </ol>
SRUL01/13	College of Science, NUERS	ACCELERATED SOLVENT EXTRACTOR (ASE) THERMO SCIENTIFIC-DIONEX ASE350	Dionex - Thermo Scientific	Minimum 2g of dried sample is added to the cell & Extraction Cell is heated to the extraction temperature, pressurized with appropriate solvent system followed by concentration. It is used for solid-liquid extraction for TPH, AHP, PAH, PCB and pesticides extraction.		<ol style="list-style-type: none"> <li>1. Organic compound extraction: Efficiently extracts a wide range of organic compounds from various matrices.</li> <li>2. Environmental contaminant analysis: Extracts pesticides, herbicides, and other environmental contaminants without degradation.</li> <li>3. Food and beverage analysis: Extracts flavor and aroma compounds, identifies contaminants, and assesses food quality.</li> <li>4. Drug compound extraction: Extracts drug compounds from various matrices for pharmaceutical research and stability monitoring.</li> <li>5. Forensic evidence extraction: Efficiently extracts DNA and other trace evidence from forensic samples without damage.</li> <li>6. Anti-doping analysis: Extracts banned substances from athletes' samples for drug testing.</li> <li>7. Materials analysis: Extracts various compounds from materials for characterization and impurity identification.</li> </ol>
SRUL01/13	College of Science, NUERS	SPECTROFLUOROMETE R- HORRIBA- FLUOROMAX3	Horiba	The species is first excited, by absorbing a photon, from its ground electronic state to one of the various vibrational states in the excited electronic state. The different wavelengths of fluorescent light emitted by a sample are measured using a monochromator, holding the excitation light at a constant wavelength.  It is used for the determination of PAH		<ol style="list-style-type: none"> <li>1. Determination of polycyclic aromatic hydrocarbons (PAHs) in environmental samples</li> <li>2. Analysis of fluorescent organic compounds (FOMs) in water and soil</li> <li>3. Monitoring of industrial emissions</li> <li>4. Assessment of environmental pollution</li> </ol>
SRUL01/13	College of Science, NUERS	PARALLEL EVAPORATOR, BUTCHI-SYNCORE PLUS	Buchi	Operating is based on fast sample evaporation by heating, orbital shaking and vacuum application of multiple samples.		<ol style="list-style-type: none"> <li>1. Concentrates extracts from various matrices for low-level contaminant and analyte analysis.</li> <li>2. Removes solvents from liquid samples, slurries, and solids for sample preparation in analytical techniques.</li> <li>3. Purifies analytes by selectively removing solvents and impurities for accurate and reliable analysis.</li> <li>4. Removes excess salts from samples to prevent interference with analytical techniques.</li> <li>5. Exchanges solvents to change analyte compatibility for specific analytical techniques.</li> <li>6. Concentrates samples for HPLC analysis, particularly for those with low analyte concentrations.</li> <li>7. Concentrates samples for GC analysis, particularly for those with low analyte concentrations or volatile analytes.</li> <li>8. Removes excess water from samples that are not water-soluble or need drying for further analysis.</li> <li>9. Recovers solvents from samples for environmental friendliness and cost-effectiveness.</li> <li>10. Dries samples for further analysis or storage.</li> </ol>
SRUL01/13	College of Science, NUERS	TURBOVAP II - ZYMARK	Zymark	It uses a patented gas vortex shearing action and optical sensors to provide fast and efficient evaporation of organic solvents. Optical sensors automatically stop gas flow when evaporation has reached its set time, thereby eliminating the risk of drying and loss of volatile compounds.		<ol style="list-style-type: none"> <li>1. Concentrates extracts from various matrices for low-level contaminant and analyte analysis.</li> <li>2. Removes solvents from liquid samples, slurries, and solids for sample preparation in analytical techniques.</li> <li>3. Purifies analytes by selectively removing solvents and impurities for accurate and reliable analysis.</li> <li>4. Removes excess salts from samples to prevent interference with analytical techniques.</li> <li>5. Exchanges solvents to change analyte compatibility for specific analytical techniques.</li> <li>6. Concentrates samples for HPLC analysis, particularly for those with low analyte concentrations.</li> <li>7. Concentrates samples for GC analysis, particularly for those with low analyte concentrations or volatile analytes.</li> <li>8. Removes excess water from samples that are not water-soluble or need drying for further analysis.</li> <li>9. Recovers solvents from samples for environmental friendliness and cost-effectiveness.</li> <li>10. Dries samples for further analysis or storage.</li> </ol>
SRUL01/13	College of Science, NUERS	TURBOVAP LV EVAPORATOR - ZYMARK	Zymark	It uses a patented gas vortex shearing action and optical sensors to provide fast and efficient evaporation of organic solvents. Optical sensors automatically stop gas flow when evaporation has reached its set time, thereby eliminating the risk of drying and loss of volatile compounds.		<ol style="list-style-type: none"> <li>1. Concentrates extracts from various matrices for low-level contaminant and analyte analysis.</li> <li>2. Removes solvents from liquid samples, slurries, and solids for sample preparation in analytical techniques.</li> <li>3. Purifies analytes by selectively removing solvents and impurities for accurate and reliable analysis.</li> <li>4. Removes excess salts from samples to prevent interference with analytical techniques.</li> <li>5. Exchanges solvents to change analyte compatibility for specific analytical techniques.</li> <li>6. Concentrates samples for HPLC analysis, particularly for those with low analyte concentrations.</li> <li>7. Concentrates samples for GC analysis, particularly for those with low analyte concentrations or volatile analytes.</li> <li>8. Removes excess water from samples that are not water-soluble or need drying for further analysis.</li> <li>9. Recovers solvents from samples for environmental friendliness and cost-effectiveness.</li> <li>10. Dries samples for further analysis or storage.</li> </ol>



SRUL01/13	College of Science, NUERS	Oven FISHERSCIENTIFIC - ISOTEMP	FISHERSCIENTIFIC	The strength of Fisher scientific Iso temp drying chamber include routine drying and sterilization tasks up to +220° C		<ol style="list-style-type: none"> <li>1. Accurately determines soil moisture content by drying soil samples to a constant weight.</li> <li>2. Preserves integrity and prevents volatile compound loss of sediment samples prior to contaminant analysis.</li> <li>3. Preserves integrity, prevents microbial growth, and prepares plant and animal tissues for analysis.</li> <li>4. Preserves collected material and prevents volatile compound loss in air and water filters before analysis.</li> <li>5. Prevents contamination of samples and ensures proper cleaning and sterilization of glassware and equipment.</li> <li>6. Accelerates curing of adhesives and sealants used in environmental monitoring and remediation equipment.</li> <li>7. Heats samples for various chemical reactions used in environmental analysis, including contaminant extraction, compound identification and quantification, and environmental material property studies.</li> <li>8. Sterilizes equipment and materials used in environmental testing to prevent contamination and ensure accurate and reliable analysis results.</li> <li>9. Dries samples for long-term preservation, particularly for future reference or legal purposes.</li> </ol>
SRUL01/13	College of Science, NUERS	LABTECH	LabTech	The strength of Lab tech series drying chamber include routine drying and sterilization tasks up to + 320° C		<p>Sample Drying and Preparation:</p> <ol style="list-style-type: none"> <li>1. Accurately determines soil moisture content by drying soil samples to a constant weight.</li> <li>2. Preserves integrity and prevents volatile compound loss of sediment samples before contaminant analysis.</li> <li>3. Maintains integrity, prevents microbial growth, and prepares plant and animal tissues for analysis.</li> <li>4. Preserves collected material and prevents volatile compound loss in air and water filters before analysis.</li> <li>5. Prevents contamination of samples and ensures proper cleaning and sterilization of glassware and equipment.</li> </ol> <p>Chemical Reactions and Material Processing:</p> <ol style="list-style-type: none"> <li>1. Accelerates curing of adhesives and sealants used in environmental equipment.</li> <li>2. Heats samples for various chemical reactions used in environmental analysis.</li> <li>3. Sterilizes equipment and materials used in environmental testing.</li> <li>4. Dries samples for long-term preservation for future reference or legal purposes.</li> </ol> <p>Additional Applications:</p> <ol style="list-style-type: none"> <li>1. Evaporates solvents from samples for analyte concentration before analysis.</li> <li>2. Removes excess water from samples, particularly those insoluble in water or requiring drying.</li> <li>3. Recovers solvents from samples for environmentally friendly and cost-effective solvent waste reduction.</li> <li>4. Dries samples for various purposes beyond environmental testing, including pharmaceutical, food, and materials science applications.</li> </ol>
SRUL01/13	College of Science, NUERS	ULTRASONICATOR COLE PARMER, 08895-32	Cole-Parmer	Ultrasonic Extraction uses cavitation bubbles induced by high frequency pressure (sound) waves to agitate a liquid. The agitation produces high forces on contaminants adhering to substrates like metals, plastics, glass, rubber, and ceramics. This action also penetrates blind holes, cracks, and recesses.		<ol style="list-style-type: none"> <li>1. Cell disruption and lysis: Releases cellular contents for DNA, RNA, and protein extraction.</li> <li>2. Emulsification and homogenization: Prepares emulsions for various products.</li> <li>3. Biomolecule extraction: Extracts biomolecules from various matrices for analysis.</li> <li>4. Polymer and macromolecule degradation: Breaks down polymers and macromolecules for analysis.</li> <li>5. Liquid degassing: Removes dissolved gases from liquids for analysis.</li> <li>6. Cleaning and surface preparation: Cleans glassware, removes contaminants, and prepares surfaces for processing.</li> <li>7. Sonochemistry: Promotes chemical reactions for synthesis, modification, and degradation.</li> <li>8. Nanoparticle synthesis: Prepares nanoparticles for various applications.</li> <li>9. Material processing: Modifies material properties, such as strength, toughness, and conductivity.</li> <li>10. Medical applications: Lithotripsy, wound healing, and drug delivery.</li> </ol>
SRUL01/13	College of Science, NUERS	GRANT	Grant	Ultrasonic Extraction uses cavitation bubbles induced by high frequency pressure (sound) waves to agitate a liquid. The agitation produces high forces on contaminants adhering to substrates like metals, plastics, glass, rubber, and ceramics. This action also penetrates blind holes, cracks, and recesses.		<ol style="list-style-type: none"> <li>1. Cell disruption and lysis: Releases cellular contents for DNA, RNA, and protein extraction.</li> <li>2. Emulsification and homogenization: Prepares emulsions for various products.</li> <li>3. Biomolecule extraction: Extracts biomolecules from various matrices for analysis.</li> <li>4. Polymer and macromolecule degradation: Breaks down polymers and macromolecules for analysis.</li> <li>5. Liquid degassing: Removes dissolved gases from liquids for analysis.</li> <li>6. Cleaning and surface preparation: Cleans glassware, removes contaminants, and prepares surfaces for processing.</li> <li>7. Sonochemistry: Promotes chemical reactions for synthesis, modification, and degradation.</li> <li>8. Nanoparticle synthesis: Prepares nanoparticles for various applications.</li> <li>9. Material processing: Modifies material properties, such as strength, toughness, and conductivity.</li> <li>10. Medical applications: Lithotripsy, wound healing, and drug delivery.</li> </ol>
SRUL01/13	College of Science, NUERS	BALANCE -KERN	Kern	A weighing balance is an instrument that is used to determine the weight or mass of an object. It is available in a wide range of sizes with multiple weighing capacities.		<ol style="list-style-type: none"> <li>1. Soil and sediment analysis: Measure soil and sediment weights for moisture content, contaminant assessment, and particle size studies.</li> <li>2. Plant and animal tissue analysis: Accurately weigh plant and animal tissues for nutrient, pesticide, and heavy metal analysis.</li> <li>3. Solution preparation: Precisely measure reagents and solvents for solution preparation in chemical analysis.</li> <li>4. Instrument calibration and testing: Weigh calibration standards and test weights during instrument calibration and testing.</li> </ol>
SRUL01/13	College of Science, NUERS	BALANCE -SARTORIUS	Sartorius	A weighing balance is an instrument that is used to determine the weight or mass of an object. It is available in a wide range of sizes with multiple weighing capacities.		<ol style="list-style-type: none"> <li>1. Soil and sediment analysis: Measure soil and sediment weights for moisture content, contaminant assessment, and particle size studies.</li> <li>2. Plant and animal tissue analysis: Accurately weigh plant and animal tissues for nutrient, pesticide, and heavy metal analysis.</li> <li>3. Solution preparation: Precisely measure reagents and solvents for solution preparation in chemical analysis.</li> <li>4. Instrument calibration and testing: Weigh calibration standards and test weights during instrument calibration and testing.</li> </ol>
SRUL01/13	College of Science, NUERS	CHILLER HUBER -POLYSTAT	Huber Polystat	It remove heat from one object and transfer it to another, usually by means of a liquid.		<ol style="list-style-type: none"> <li>1. Temperature Control for Chemical Reactions</li> <li>2. Promoting chemical reactions at specific temperatures</li> <li>3. Controlling crystallization processes</li> <li>4. Regulating enzyme activity</li> <li>5. Sample Preservation and Storage</li> <li>6. Preserving temperature-sensitive samples</li> <li>7. Maintaining stability of reagents and solutions</li> <li>8. Preserving reference materials</li> </ol>
SRUL01/13	College of Science, NUERS	CHILLER COLE-PARMER -POLYSTAT	Cole-Parmer	It remove heat from one object and transfer it to another, usually by means of a liquid.		<ol style="list-style-type: none"> <li>1. Temperature Control for Chemical Reactions</li> <li>2. Promoting chemical reactions at specific temperatures</li> <li>3. Controlling crystallization processes</li> <li>4. Regulating enzyme activity</li> <li>5. Sample Preservation and Storage</li> <li>6. Preserving temperature-sensitive samples</li> <li>7. Maintaining stability of reagents and solutions</li> <li>8. Preserving reference materials</li> </ol>
SRUL01/13	College of Science, NUERS	LIQUID LIQUID EXTRACTION	Manual Setup - No manufacturer	Separatory funnel extraction is used for water samples in liquid liquid extraction. Extraction of Hydrocarbons from water samples for TPH, AHP, PAH Analysis by GC/FID and GC/MS. The principle of LLE involves transferring an analyte from an aqueous matrix into an extraction solvent that may be analyzed by GC/MS and GC/FID		<p>Analysis</p> <ol style="list-style-type: none"> <li>1. Detects and quantifies organic compounds in environmental samples (soil, water, sediment)</li> <li>2. Monitors drug levels in the body and detects drug residues in biological samples</li> <li>3. Extracts contaminants from food and beverage samples to ensure safety</li> <li>4. Isolates essential oils and fragrances from plant material for analysis and development</li> <li>5. Extracts natural products from plant material for analysis and development</li> </ol> <p>Uses</p> <ol style="list-style-type: none"> <li>1. Purifies pharmaceuticals and other drugs by removing impurities</li> <li>2. Removes heavy metals and contaminants from water and soil</li> <li>3. Prepares samples for analysis by GC, LC, and MS</li> <li>4. Produces biodiesel from plant oils</li> <li>5. Measures pollutant concentrations in air, water, and soil for environmental monitoring</li> </ol>
SRUL01/13	College of Science, NUERS	DISTILLATION	Manual Setup - No manufacturer	The basic principle behind the distillation of process is that different liquids boil at different temperatures. So when a mixture is heated, the substance with lower boiling point starts to boil first and convert into vapours which can be then collected separately.		<p>vAnalysis</p> <ol style="list-style-type: none"> <li>1. Separation of pure substances from mixtures</li> <li>2. Determination of alcohol content in beverages</li> <li>3. Purification of water</li> <li>4. Production of essential oils</li> <li>5. Analysis of petroleum products</li> </ol> <p>Uses</p> <ol style="list-style-type: none"> <li>1. Production of ethanol</li> <li>2. Production of pharmaceuticals</li> <li>3. Production of perfumes</li> <li>4. Production of chemicals</li> <li>5. Desalination of seawater</li> </ol>



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## Research Sector

### General Facilities & Specialized Research Units & Laboratories

#### Science - Inorganic Lab Equipment

اسم الجهة Institute/ Department	اسم الجهاز Equipment name	الجهة المصنعة Manufacturer	وصف نموذج للجهاز Equipment Description	صورة الجهاز Equipment Photo	استخدامات الجهاز uses of equipment
SRUL01/13	College of Science, NUERS	Inductively coupled plasma -Optical Emission Spectro meter PerkinElmer 7300	PerkinElmer	Analysis of Metals in Soil,Water, Vegetation ,Biota	 <ol style="list-style-type: none"> <li>1.Elemental analysis</li> <li>2.Quantitative determination of elements in a wide range of samples</li> <li>3.Identification of unknown elements in samples</li> <li>4.Environmental monitoring</li> <li>5.Monitoring the concentration of heavy metals in water, soil, and sediment to assess environmental quality</li> <li>6.Identifying and quantifying pollutants in wastewater and industrial effluents</li> <li>7.Industrial process control</li> <li>8.Monitoring the concentration of elements in raw materials, intermediates, and final products to ensure product quality</li> <li>9.Troubleshooting industrial processes and identifying potential contaminants</li> <li>10.Research</li> <li>11.Conducting research on the fate and transport of elements in the environment</li> <li>12.Developing new methods for the analysis of elements</li> <li>13.Understanding the role of elements in biological processes</li> </ol>
SRUL01/13	College of Science, NUERS	Inductively coupled plasma -Optical Emission Spectro meter PerkinElmer AVIO200	PerkinElmer	Analysis of Metals in Soil,Water, Vegetation ,Biota and oil	 <ol style="list-style-type: none"> <li>1.Environmental monitoring: Monitors trace elements in water, soil, sediment, and air to assess environmental impact.</li> <li>2.Environmental monitoring with ICPOES</li> <li>3.Industrial process control: Monitors elemental composition of raw materials, products, and waste streams to ensure product quality, optimize process efficiency, and comply with environmental regulations.</li> <li>4.Pharmaceutical and food safety: Monitors trace elements in pharmaceuticals and food products to ensure product safety and quality.</li> <li>5.Geochemistry and geology: Determines elemental composition of rocks, minerals, and soils to study Earth's history and understand geological processes.</li> <li>6.Material science: Determines elemental composition of metals, alloys, and ceramics to develop new materials and improve properties of existing materials.</li> </ol>
SRUL01/13	College of Science, NUERS	Mercury Analyser - Hydra II	Hydra II	Analysis of Mercury in Soil,Water, Vegetation ,Biota	 <ol style="list-style-type: none"> <li>1.Measures the total mercury content in a variety of liquid and solid samples.</li> <li>2.Used for environmental monitoring, industrial process control, and research.</li> <li>3.Analyzes soil, water, sediment, air filters, and biological samples.</li> <li>4.Provides accurate and reliable results with low detection limits.</li> <li>5.Easy to use and maintain.</li> </ol>
SRUL01/13	College of Science, NUERS	FLOW INJECTION ANALYSIS SYSTEM,Quick Chem 8500	Quick Chem	Analysis of Nutrients like Ammonia, Silicate,OrthoPhosphate,Total Phosphorus, in Soil,Water,Vegetation,Biota	 <ol style="list-style-type: none"> <li>1.Determining the concentration of a wide range of analytes in a variety of samples, including water, wastewater, food, and pharmaceuticals.</li> <li>2.Monitoring water quality and identifying sources of pollution.</li> <li>3.Troubleshooting industrial processes and identifying potential contaminants.</li> <li>4.Developing new products and processes that utilize FIA.</li> <li>5.Performing research in a variety of fields, including environmental science, chemistry, and biology</li> </ol>
SRUL01/13	College of Science, NUERS	TOC-VCPH TOTAL ORGANIC CARBON ANALYZER BY SHIMADZU with ASI- V Water Module and Solid Sample Module SSM -50000A	Shimadzu Corporation	Inorganic carbon from carbonates and bicarbonates is removed by acid treatment organic compounds are decomposed by pyrolysis in the presence of oxygen. The carbon dioxide that is formed is determined by direct non-dispersive infrared detection.  Analysis of Total Organic carbon in Water, Soil and Solid materials.	 <ol style="list-style-type: none"> <li>1.Measuring total organic carbon (TOC) in a wide range of samples, including water, wastewater, soil, sediment, and sludge.</li> <li>2.Monitoring water quality and identifying sources of organic pollution.</li> <li>3.Evaluating the performance of wastewater treatment plants.</li> <li>4.Determining the organic carbon content of soil to assess soil fertility and organic matter content.</li> <li>5.Analyzing the organic carbon content of sediment and sludge to assess environmental quality and identify potential contaminants.</li> <li>6.Measuring the TOC content of food and pharmaceutical products to ensure compliance with safety regulations.</li> <li>7.Conducting research in a variety of fields, including environmental science, water quality management, and soil science.</li> </ol>
SRUL01/13	College of Science, NUERS	TOC ASI-V	Shimadzu Corporation	Detector only, transferred from College of Life Science. Using the spare parts for shimadzu TOC module	 <ol style="list-style-type: none"> <li>1.Detect organic compounds</li> <li>2.Measure organic compounds</li> <li>3.Quantify TOC</li> <li>4.Monitor TOC over time</li> <li>5.Research organic carbon content of water</li> </ol>
SRUL01/13	College of Science, NUERS	TOTAL NITROGEN ANALYZER -LOTIX- TELEDYNE TEKMAR TN WITH LSS BOAT	TELEDYNE TEKMAR	The sample is injected by an auto sampler into a high temperature (680C) combustion reactor with an oxidative catalyst, converting all forms of nitrogen to nitric oxide (NO). The No is quantitated with a chemiluminescent detector.  Analysis of Total Organic carbon(TOC),TC And IC in Water samples & Analysis of Total Nitrogen in Water samples and Analysis of Total Organic carbon in Soil and Solid materialsSolids ( Paper, cardboard, Plastic & Food) .	 <ol style="list-style-type: none"> <li>1.Measuring the total nitrogen content of a wide range of samples, including soil, water, plant tissue, and food.</li> <li>2.Monitoring soil fertility and optimizing fertilizer application.</li> <li>3.Assessing water quality and identifying sources of nitrogen pollution.</li> <li>4.Evaluating the nutritional value of food and ensuring compliance with food safety regulations.</li> <li>5.Conducting research in a variety of fields, including agriculture, environmental science, and food science.</li> </ol>



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SRUL01/13	College of Science, NUERS	PURIFICATION SYSTEM ELLIX-QZRXQ.005WW MILLI-Q	ELLIX - PURIFICATION SYSTEM	De Ionised water collecting for Eltre lab Analytical Purposes		<ol style="list-style-type: none"> <li>1.Removing impurities:Removes inorganic ions, organic compounds, and particles from water.</li> <li>2.Providing consistent quality:Multi-stage purification process and use of high-quality components ensure consistent quality ultrapure water.</li> <li>3.Monitoring and control:Conductivity, TOC, and resistivity monitoring and data logging to ensure ultrapure water quality.</li> <li>4.Easy to use and maintain:User-friendly interface and automated features for easy use and maintenance.</li> <li>5.Compact and portable:Ideal for use in a variety of laboratory settings.</li> </ol>
SRUL01/13	College of Science, NUERS	ION CHROMATOGRAPHY DIONEX IES 5000 AS	Dionex Thermo Scientific	Ion chromatographic analysis of samples for fluoride, chloride, nitrite-N, bromide, nitrate-N, orthophosphate-P, and sulfate. The anions of interest are separated and measured, using a system comprised of a guard column, analytical column, suppressor device, and conductivity detector. Drinking water analysis for pollution and other constituents. Determination of water chemistries in aquatic ecosystems. Determination solid samples.		<ol style="list-style-type: none"> <li>1.Separating and quantifying ions in a variety of samples, including water, wastewater, food, and pharmaceuticals.</li> <li>2.Monitoring water quality to ensure compliance with environmental regulations.</li> <li>3.Troubleshooting ion-related problems in industrial processes.</li> <li>4.Developing new products and processes that utilize ion chromatography.</li> <li>5.Performing research in a variety of fields, including environmental science, chemistry, and biology.</li> </ol>
SRUL01/13	College of Science, NUERS	MUFFLE FURNACE-CARBOLITE	CARBOLITE- GERO	Muffle furnace is to heat the air inside its chamber using the basic fundamentals of thermal convection and thermal radiation.		<ol style="list-style-type: none"> <li>1.Heat materials to high temperatures in a controlled environment</li> <li>2.Ash samples for chemical analysis</li> <li>3.Remove moisture from materials</li> <li>4.Sterilize materials</li> <li>5.Fuse glass and other materials</li> </ol>
SRUL01/13	College of Science, NUERS	COD NANOCOLOR VISII	Macherey- Nagel	Chemical Oxygen Demand (COD) is a test that measures the amount of oxygen required to chemically oxidize the organic material and inorganic nutrients, such as Ammonia or Nitrate, present in water. Applied for soiland water samples		<ol style="list-style-type: none"> <li>1.Measures the amount of oxygen required to chemically oxidize organic and inorganic matter in water and soil.</li> <li>2.Assesses the overall pollution load of wastewater and soil.</li> <li>3.Monitors the efficiency of wastewater treatment plants and soil remediation efforts.</li> <li>4.Identifies sources of organic and inorganic pollutants in water and soil.</li> <li>5.Regulates the discharge of wastewater and soil into the environment.</li> </ol>
SRUL01/13	College of Science, NUERS	BOD INCUBATOR	Velp Scientifica	BOD is the amount of oxygen utilized by microorganisms while stabilizing biologically decomposable organic matter in waste water under aerobic condition. Applied for waste water sample		<ol style="list-style-type: none"> <li>1.Measure the amount of organic matter in wastewater.</li> <li>2.Assess the strength of wastewater and determine treatment requirements.</li> <li>3.Monitor the efficiency of wastewater treatment plants.</li> <li>4.Identify sources of organic pollution in waterways.</li> <li>5.Regulate the discharge of wastewater into the environment.</li> <li>6.Measuring organic matter</li> <li>7.Assessing strength</li> <li>8.Monitoring treatment</li> <li>9.Identifying pollution</li> <li>10.Regulating discharge</li> </ol>
SRUL01/13	College of Science, NUERS	OVEN	Binder ED	A preheating chamber with an integrated high-performance heating and cooling system surrounds the inner chamber of our simulation chambers.		<ol style="list-style-type: none"> <li>1.Soil moisture determination: Dry soil samples to a constant weight for accurate moisture content determination.</li> <li>2.Sediment analysis preparation: Dry sediment samples to preserve integrity and prevent volatile compound loss before contaminant analysis.</li> <li>3.Tissue sample preparation: Dry plant and animal tissues to preserve integrity, prevent microbial growth, and prepare for analysis.</li> <li>4.Filter drying: Dry air and water filters to preserve collected material, prevent volatile compound loss, and prepare for analysis.</li> <li>5.Glassware and equipment sterilization: Dry glassware and equipment used in environmental testing to prevent sample contamination and ensure proper cleaning.</li> </ol>
SRUL01/13	College of Science, NUERS	TURBIDITY METER TURB-430 IR	Xylem Analytics	Turb 430 IR is a portable turbidity meter from <b>WTW</b> , designed for use in the measuring range from 0 – 1100 NTU/FNU.		<ol style="list-style-type: none"> <li>1.Measuring turbidity of water and other liquids</li> <li>2.Monitoring water quality in a variety of applications, including drinking water, wastewater, and industrial process water</li> <li>3.Troubleshooting turbidity issues in water systems</li> <li>4.Verifying the effectiveness of water treatment processes</li> <li>5.Ensuring compliance with turbidity regulations</li> </ol>
SRUL01/13	College of Science, NUERS	Fisher Scientific Accumet Research AR50 Dual Channel pH/Ion/Conductivity Meter	Fisher Scientific	A pH meter provides a value as to how acidic or alkaline a liquid is. The basic principle of the pH meter is to measure the concentration of hydrogen ions. Acids dissolve in water forming positively charged hydrogen ions (H+). Similarly alkali or bases dissolve in water forming negatively charged hydrogen ions (OH-). The amount of these hydrogen ions present solution is dissolved in some amount of water determines the pH. Conductivity meter measures the electrical conductivity in a solution. Applied for Water, seawater, wastewater, solid samples		<ol style="list-style-type: none"> <li>1.Measure pH, mV, ion concentration, or conductivity in various liquid samples</li> <li>2.Monitor pH, ion concentration, or conductivity in industrial processes or environmental monitoring applications</li> <li>3.Evaluate the quality of water, wastewater, or other liquid samples</li> <li>4.Assess the purity of chemicals or reagents</li> <li>5.Conduct research and development experiments involving pH, ion concentration, or conductivity measurements</li> </ol>



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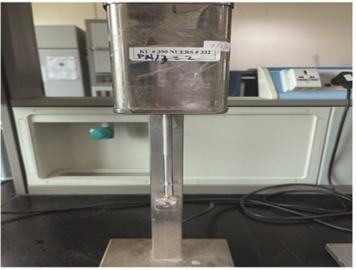
SRUL01/13	College of Science, NUERS	CENTRIFUGE	Biofuge	Centrifugation is a process for separating or concentrating materials suspended in a liquid medium, this technique is the effect of gravity on particles in suspension. The centrifugal force is proportional to the rotation rate of the rotor. The centrifuge is made up of a rotor and a refrigerated chamber powered by an electric motor.		<ol style="list-style-type: none"> <li>1. Separating mixtures with close densities, such as cream from milk and plasma from blood.</li> <li>2. Separating immiscible liquids, such as oil from water and oil from salad dressing.</li> <li>3. Sedimenting suspended solids out of a liquid, such as removing sediment from urine samples and clarifying cloudy liquids.</li> <li>4. Separating blood components, such as red blood cells from plasma and white blood cells from platelets.</li> <li>5. Isolating DNA and RNA from cells and tissues for molecular biology research.</li> <li>6. Testing for drugs of abuse in urine samples by separating solids and concentrating the drugs.</li> <li>7. Preparing samples for analysis in various industries, such as removing water from soil samples and concentrating minerals in ores.</li> </ol>
SRUL01/13	College of Science, NUERS	Metrohm Dosimat Plus -865 (Salinity Meter)	Metrohm	The chloride ions present in the sample react with the titrant silver nitrate (AgNO <sub>3</sub> ) to form silver chloride (AgCl), which gets precipitated quantitatively before the potassium chromate (K <sub>2</sub> CrO <sub>4</sub> ) indicator forms the brick-red silver chromate (Ag <sub>2</sub> CrO <sub>4</sub> ), which is the indication of an end point of the titration.		<ol style="list-style-type: none"> <li>1. Measuring the salinity of seawater, brackish water, and freshwater</li> <li>2. Monitoring salinity levels in industrial wastewater treatment plants</li> <li>3. Assessing the quality of drinking water and irrigation water</li> <li>4. Investigating the impact of environmental factors on salinity levels</li> </ol>
SRUL01/13	College of Science, NUERS	Fisher Scientific Accumet AB 200	Fisher Scientific	A pH meter provides a value as to how acidic or alkaline a liquid is. The basic principle of the pH meter is to measure the concentration of hydrogen ions. Acids dissolve in water forming positively charged hydrogen ions (H <sup>+</sup> ). Similarly alkali or bases dissolve in water forming negatively charged hydrogen ions (OH <sup>-</sup> ). The amount of these hydrogen ions present solution is dissolved in some amount of water determines the pH. Conductivity meter measures the electrical conductivity in a solution. Applied for Water, seawater, wastewater, solid samples		<ol style="list-style-type: none"> <li>1. Measuring the pH of water and wastewater samples.</li> <li>2. Monitoring pH levels in environmental monitoring applications.</li> <li>3. Evaluating the acidity or alkalinity of various environmental samples.</li> <li>4. Assessing the potential environmental impact of pollutants or industrial processes.</li> <li>5. Investigating the effects of environmental factors on pH levels.</li> <li>6. Water quality testing</li> <li>7. Pollution control</li> <li>8. Soil and sediment analysis</li> <li>9. Plant tissue analysis</li> </ol>
SRUL01/13	College of Science, NUERS	Hanna Instruments Conductivity Bench Top	Hanna Instruments	A pH meter provides a value as to how acidic or alkaline a liquid is. The basic principle of the pH meter is to measure the concentration of hydrogen ions. Acids dissolve in water forming positively charged hydrogen ions (H <sup>+</sup> ). Similarly alkali or bases dissolve in water forming negatively charged hydrogen ions (OH <sup>-</sup> ). The amount of these hydrogen ions present solution is dissolved in some amount of water determines the pH. Conductivity meter measures the electrical conductivity in a solution. Applied for Water, seawater, wastewater, solid samples		<ol style="list-style-type: none"> <li>1. Measure the conductivity of water and other aqueous solutions</li> <li>2. Monitor water quality in a variety of applications, including aquaculture, hydroponics, and industrial water treatment</li> <li>3. Determine the concentration of total dissolved solids (TDS) in water</li> <li>4. Calibrate conductivity probes and sensors</li> <li>5. Generate conductivity data for research and analysis</li> </ol>
SRUL01/13	College of Science, NUERS	Cole-Parmer sonicator	Cole - Parmer	The vibrations from the converter are intensified by the probe, creating pressure waves in the liquid.		<ol style="list-style-type: none"> <li>1. Cell disruption and lysis: Releases cellular contents for DNA, RNA, and protein extraction.</li> <li>2. Emulsification and homogenization: Prepares emulsions for various products.</li> <li>3. Biomolecule extraction: Extracts biomolecules from various matrices for analysis.</li> <li>4. Polymer and macromolecule degradation: Breaks down polymers and macromolecules for analysis.</li> <li>5. Liquid degassing: Removes dissolved gases from liquids for analysis.</li> <li>6. Cleaning and surface preparation: Cleans glassware, removes contaminants, and prepares surfaces for processing.</li> <li>7. Sonochemistry: Promotes chemical reactions for synthesis, modification, and degradation.</li> <li>8. Nanoparticle synthesis: Prepares nanoparticles for various applications.</li> <li>9. Material processing: Modifies material properties, such as strength, toughness, and conductivity.</li> <li>10. Medical applications: Lithotripsy, wound healing, and drug delivery.</li> </ol>
SRUL01/13	College of Science, NUERS	UV-Spectrophotometer Thermo Scientific Model no: EVO600 Ultra Violet-Visible Spectrophotometer (UV-Vis) (Thermo Scientific Evolution-600)	Thermo Scientific	To measure the amount of light that a sample absorbs. The instrument operates by passing a beam of light through a sample and measuring the intensity of light reaching a detector. Chlorophyll analysis.		<ol style="list-style-type: none"> <li>1. Measure the absorbance of a solution at a specific wavelength.</li> <li>2. This can be used to quantify the concentration of a substance in the solution.</li> <li>3. Measure the emission spectrum of a substance.</li> <li>4. This can be used to identify the substance and to determine its purity.</li> <li>5. Study the kinetics of a chemical reaction.</li> <li>6. This can be done by measuring the absorbance of the reactants and products at different times.</li> <li>7. Study the structure of a molecule.</li> <li>8. This can be done by measuring the absorbance of the molecule at different wavelengths.</li> <li>9. Measure the color of a solution.</li> <li>10. This can be used to determine the concentration of a substance in the solution.</li> </ol>

## Research Sector General Facilities & Specialized Research Units & Laboratories Science - Soil Lab

اسم الجهة Institute/ Department	اسم الجهاز Equipment name	الجهة المصنعة Manufacturer	وصف موجز للجهاز Equipment Description	صورة الجهاز Equipment Photo	استخدامات الجهاز uses of equipment
SRUL01/13 College of Science, NUERS	ELEMENTAL ANALYZER TRUSPEC CHN-LECO AND TRUSPEC SULFUR ADD ON	LECO Corporation	ELEMENTAL ANALYZER TRUSPEC CHN-LECO FOR CARBON, HYDROGEN AND NITROGEN ANALYZER AND TRUSPEC SULFUR ADD ON FOR SULFUR ANALYZER		<ol style="list-style-type: none"> <li>1.Determination of carbon, hydrogen, and nitrogen in a wide range of organic samples, including pharmaceuticals, food, polymers, and petrochemical products.</li> <li>3.Quality control of organic materials to ensure consistent composition and purity.</li> <li>4.Development of new organic products by providing information about their elemental composition.</li> <li>5.Environmental monitoring by measuring the elemental composition of pollutants in air, water, and soil.</li> <li>6.Determination of sulfur content in organic samples, in addition to carbon, hydrogen, and nitrogen.</li> <li>7.Analysis of sulfur-containing compounds in petroleum products, rubber, and other materials.</li> <li>8.Environmental monitoring of sulfur-containing pollutants, such as sulfur dioxide and sulfate aerosols.</li> <li>9.Research on the role of sulfur in biological processes and the development of sulfur-containing drugs.</li> </ol>
SRUL01/13 College of Science, NUERS	PARR OXYGEN BOMB CALORIMETER	Parr Instruments	642EF EXPANDED CALORIMETER SYSTEM INCLUDE ISOPERIBOL CALORIMETER for the determination of the gross calorific value of organic soil samples by bomb calorimeter.		<p>Uses</p> <ol style="list-style-type: none"> <li>1.Determination of the gross calorific value (GCV) of organic soil samples</li> <li>2.Evaluation of the energy content of organic soil samples</li> <li>3.Assessment of the potential of organic soil samples as energy sources</li> <li>4.Comparison of the energy content of different organic soil samples</li> <li>5.Monitoring changes in the energy content of organic soil samples over time</li> </ol> <p>Analysis</p> <ol style="list-style-type: none"> <li>1.Weigh a representative sample of organic soil into a crucible.</li> <li>2.Place the crucible into the bomb calorimeter and seal the bomb.</li> <li>3.Fill the bomb with oxygen to a predetermined pressure.</li> <li>4.Ignite the sample electrically.</li> <li>5.Measure the temperature rise in the bomb.</li> <li>6.Calculate the GCV of the organic soil sample using the following formula:</li> </ol>
SRUL01/13 College of Science, NUERS	FREEZE DRY / SHELL FREEZE SYTEM BY LABCONCO Machine #1	Labconco	FREEZE DRY MACHINE #1 is use for Freeze-drying or lyophilizing in the process of drying in a frozen state under high vacuum for preservation vacuum for preservation with Sixteen (16) Port Dryinf Chamber		<ol style="list-style-type: none"> <li>1.Sample preservation: Preserve biological samples, including microorganisms, plant tissues, and animal tissues, for long-term storage and transportation.</li> <li>2.Water and soil analysis: Concentrate solutes in water and soil samples, making detection and quantification easier.</li> <li>3.Wastewater treatment: Reduce wastewater volume for cost-effective and environmentally friendly disposal.</li> </ol>
SRUL01/13 College of Science, NUERS	FREEZE DRY / SHELL FREEZE SYTEM BY LABCONCO Machine #3	Labconco	FREEZE DRY MACHINE #3 WITH STOPPERING TRAY is use for Freeze-drying or lyophilizing in the process of drying in a frozen state under high vacuum for preservation. vacuum for preservation with Six (6) Port Dryinf Chamber		<ol style="list-style-type: none"> <li>1.Sample preservation: Preserve biological samples, including microorganisms, plant tissues, and animal tissues, for long-term storage and transportation.</li> <li>2.Water and soil analysis: Concentrate solutes in water and soil samples, making detection and quantification easier.</li> <li>3.Wastewater treatment: Reduce wastewater volume for cost-effective and environmentally friendly disposal.</li> </ol>
SRUL01/13 College of Science, NUERS	FREEZE DRY / SHELL FREEZE SYTEM BY LABCONCO Machine #4	Labconco	FREEZE DRY MACHINE #4 is use for Freeze-drying or lyophilizing in the process of drying in a frozen state under high vacuum for preservation. vacuum for preservation with Sixteen (16) Port Dryinf Chamber		<ol style="list-style-type: none"> <li>1.Sample preservation: Preserve biological samples, including microorganisms, plant tissues, and animal tissues, for long-term storage and transportation.</li> <li>2.Water and soil analysis: Concentrate solutes in water and soil samples, making detection and quantification easier.</li> <li>3.Wastewater treatment: Reduce wastewater volume for cost-effective and environmentally friendly disposal.</li> </ol>
SRUL01/13 College of Science, NUERS	FREEZE DRY / SHELL FREEZE SYTEM BY LABCONCO, Prime Mate Oil changer	Labconco	Prime mate oil changer system for removing old oil from vacuum pump and replacing with new and fresh oil on Freezev Dry Macine.		<ol style="list-style-type: none"> <li>1.Efficiently removes old, contaminated oil from the vacuum pump of a freeze-drying machine.</li> <li>2.Prevents contamination of freeze-drying processes and ensures the integrity of samples.</li> <li>3.Replenishes the vacuum pump with fresh, clean oil to maintain optimal performance and extend its lifespan.</li> <li>4.Contributes to the overall maintenance and upkeep of freeze-drying equipment in environmental labs.</li> </ol>
SRUL01/13 College of Science, NUERS	FRITZ PULVERISETTE	FRITSCH	PLANETARY MILL Machine use for grinding and milling , mixing and homiginizing soil sample and biota on the desire final fineness		<ol style="list-style-type: none"> <li>1.Efficiently grinds and mills soil samples and biota to achieve desired particle size.</li> <li>2.Homogenizes samples for consistent and representative analysis.</li> <li>3.Prepare samples for various environmental analyses, including soil texture determination, contaminant analysis, and organic matter studies.</li> <li>4.Simplifies sample preparation for environmental research and monitoring.</li> </ol>



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SRUL01/13	College of Science, NUERS	GILSON - ROTAP (CHRISTISON) Machine Shaker #1	GILSON	A Sieve shaker machine that is used to separate particles into different sizes of sieve by Tapping and shaking movement into rotation motion.		<ol style="list-style-type: none"> <li>1.Mixes and homogenizes samples for consistency and representative analysis</li> <li>2.Extracts analytes from various matrices for accurate quantification</li> <li>3.Suspends and disperses solids for uniform distribution and analysis</li> <li>4.Promotes chemical reactions for faster and more efficient completion</li> <li>5.Aerates samples to maintain aerobic conditions and prevent analyte degradation</li> <li>6.Accelerates sample incubation for improved laboratory workflow</li> <li>7.Conditions samples for further analysis by adjusting pH, removing contaminants, or enhancing analyte extraction</li> <li>8.Processes materials to modify properties, extract compounds, or promote reactions</li> </ol>
SRUL01/13	College of Science, NUERS	GILSON - ROTAP (CHRISTISON) Machine Shaker #4	GILSON	A Sieve shaker machine that is used to separate particles into different sizes of sieve by Tapping and shaking movement into rotation motion.		<ol style="list-style-type: none"> <li>1.Mixes and homogenizes samples for consistency and representative analysis</li> <li>2.Extracts analytes from various matrices for accurate quantification</li> <li>3.Suspends and disperses solids for uniform distribution and analysis</li> <li>4.Promotes chemical reactions for faster and more efficient completion</li> <li>5.Aerates samples to maintain aerobic conditions and prevent analyte degradation</li> <li>6.Accelerates sample incubation for improved laboratory workflow</li> <li>7.Conditions samples for further analysis by adjusting pH, removing contaminants, or enhancing analyte extraction</li> <li>8.Processes materials to modify properties, extract compounds, or promote reactions</li> </ol>
SRUL01/13	College of Science, NUERS	SHELLAB Oven #1	Shellab	Drying oven used for several test and analysis and drying of wash and cleaned apparatus and glassware.		<ol style="list-style-type: none"> <li>1.Accurately determines soil moisture content by drying soil samples to a constant weight.</li> <li>2.Preserves integrity and prevents volatile compound loss of sediment samples prior to contaminant analysis.</li> <li>3.Preserves integrity, prevents microbial growth, and prepares plant and animal tissues for analysis.</li> <li>4.Preserves collected material and prevents volatile compound loss in air and water filters before analysis.</li> <li>5.Prevents contamination of samples and ensures proper cleaning and sterilization of glassware and equipment.</li> <li>6.Accelerates curing of adhesives and sealants used in environmental monitoring and remediation equipment.</li> <li>7.Heats samples for various chemical reactions used in environmental analysis, including contaminant extraction, compound identification and quantification, and environmental material property studies.</li> <li>8.Sterilizes equipment and materials used in environmental testing to prevent contamination and ensure accurate and reliable analysis results.</li> <li>9.Dries samples for long-term preservation, particularly for future reference or legal purposes.</li> </ol>
SRUL01/13	College of Science, NUERS	GAST Vacuum Pump #2	GAST	Vacuum Pump with a range of 20 PSI, highly used for TDS and TSS determination filtration process.		<ol style="list-style-type: none"> <li>1.Filters TDS and TSS samples to accurately determine their concentrations.</li> <li>2.Prepare TDS and TSS samples for analysis by removing solids and concentrating dissolved solids.</li> <li>3.Optimizes laboratory workflow by speeding up the filtration process.</li> <li>4.Supports environmental monitoring and water quality assessment by providing accurate TDS and TSS data.</li> <li>5.Facilitates industrial process control by monitoring TDS and TSS levels.</li> <li>6.Aids in research and development by enabling the study of TDS and TSS levels.</li> </ol>
SRUL01/13	College of Science, NUERS	GAST Vacuum Pump #3	GAST	Vacuum Pump with a range of 20 PSI, highly used for TDS and TSS determination filtration process.		<ol style="list-style-type: none"> <li>1.Filters TDS and TSS samples to accurately determine their concentrations.</li> <li>2.Prepare TDS and TSS samples for analysis by removing solids and concentrating dissolved solids.</li> <li>3.Optimizes laboratory workflow by speeding up the filtration process.</li> <li>4.Supports environmental monitoring and water quality assessment by providing accurate TDS and TSS data.</li> <li>5.Facilitates industrial process control by monitoring TDS and TSS levels.</li> <li>6.Aids in research and development by enabling the study of TDS and TSS levels.</li> </ol>
SRUL01/13	College of Science, NUERS	COLDSTREAM Stirring Apparatus #1	Coldstream	STIRRING APPARATUS -used for dispersion of soil sample for hydrometer reading.		<ol style="list-style-type: none"> <li>1.Disperses soil particles uniformly in a liquid suspension for accurate hydrometer readings.</li> <li>2.Ensures consistent and representative sample preparation for reliable soil analysis.</li> <li>3.Promotes thorough mixing of soil and dispersing agent to achieve optimal dispersion.</li> <li>4.Prevents sedimentation and settling of soil particles during hydrometer testing.</li> <li>5.Contributes to accurate determination of soil texture and particle size distribution.</li> </ol>
SRUL01/13	College of Science, NUERS	BOEKEL Water Bath	Boekel Scientific	Water bath with timer and temperature adjustment and 8 slot for sample run. Use for TDS and TSS analysis by evaporating water content from sample.		<ol style="list-style-type: none"> <li>1.Concentrates samples by evaporating water content for TDS and TSS analysis.</li> <li>2.Provides precise temperature control for consistent and accurate evaporation rates.</li> <li>3.Accommodates multiple samples simultaneously for efficient analysis.</li> <li>4.Simplifies sample preparation for TDS and TSS determination.</li> </ol>
SRUL01/13	College of Science, NUERS	PRECISION Water Bath	PRECISION	Water bath with temperature adjustment and 8 slot for sample run. Use for TDS and TSS analysis by evaporating water content from sample.		<ol style="list-style-type: none"> <li>1.Concentrates samples by evaporating water content for TDS and TSS analysis.</li> <li>2.Provides precise temperature control for consistent and accurate evaporation rates.</li> <li>3.Accommodates multiple samples simultaneously for efficient analysis.</li> <li>4.Simplifies sample preparation for TDS and TSS determination.</li> </ol>