



- Constituent College of JSS Science and Technology University
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University for World Bank Assistance



DEPARTMENT OF ENVIRONMENTAL ENGINEERING

The department is well equipped with specialized equipment and instruments serving the purposes of both analyses and bench scale treatment feasibility studies. All the six laboratories (Table 1.) are equipped for analysis of water samples, wastewater samples, sludge samples, solid waste samples and soil samples. These laboratories are used by UG, PG and Ph.D students and also used for consultancy work as well.

Table 1. Details of laboratories equipment's

Sl. No.	Name of the laboratory	Specialized equipment, name and numbers	Equipment details		Utilization details from the perspective of PO attainment
			Make	Application	
1	Environmental Process Lab	Jar test Apparatus (1 No.)	Murhophe Scientific company	Optimum Coagulant dosage	PO2
		COD Digester (5Nos.)	Hach (3Nos.) Lovi Bond (2Nos.)	Chemical Oxygen demand in water and wastewater	PO2, PO4
		Muffle furnace (1 No.)	Quesst	Volatile solids and ash, metal recovery	PO4
		Hot air oven (1 No.)	Quesst	Total Solids in water and wastewater, moisture content in sludge/ soil / solid waste	PO2
		Desiccators (3Nos.)	Borosil	To reduce the sample temperature to room temperature	PO1, PO4
		Remi-duty stirrer with 0.5 HP motor of continuously variable with auto-transformer	Eltek	Routine laboratory and research work	PO1
		Remi-medium duty stirrer with 1/8 HP motor and continuously variable autotransformer	Eltek	Routine laboratory and research work	PO1

		169 Motor Operated Seive Shaker + 13 Nos. Test Seives + 1Lid Pan	Pritec	Separation and size determination of particles	PO1
		Current Meter		To measure river flow velocity	PO1
		Upright Deep Freezer	Vestfrost	To preserve and store water and wastewater samples	PO1
		Cooled Gradient Palm Cycler (PCR)			PO3
		Rotary Flash Evaporator	Heidolph Etech	Separation of solvents from samples	PO4
		Stirrer Light duty		Homogenizing liquid samples	PO1
		Air Compressor		Straining air to trap solid particles and separate liquids from compressed air.	PO2
		Icematic Flakers Machine Model -F - 80c		Used in Microbiology lab, water quality analysis Lab	PO5
		DC Power Supply Unit	Aplab	Used for electrocoagulation experiments	PO1
		pH meter (1)	Elico	Measure the pH of samples.	PO1
2	Analysis lab	Turbidity meter (1 No.)	Systronics	Turbidity measurements in water and wastewater	PO1
		BOD Incubators (2)	Remi	To maintain favorable temperature for wastewater samples.	PO2
		Conductivity meter (3 Nos.)	<ul style="list-style-type: none"> • Labotronics (02 Nos.) • YSI (01 No.) 	Measurement of Conductivity in surface and ground water, wastewater, etc.	PO1, PO2
		pH meter (1 No.)	Elico	Determine the pH of water and wastewater/sludge /soil samples	PO1
		Flame photometer (1 No.)	Elico	Determination of Sodium and Potassium	PO2, PO4
		TKN Unit (1 No.)	KELPLUS SUPRA-LXVA	Measurement of TKN in wastewaters	PO4, PO6

		DO Meter with BOD probe	YSI	Onsite measurement of DO and BOD analysis	PO2, PO4
		VIS- Portable Spectrometer (1 No.)	Hach	Measurement of absorbance of NO ₃ , PO ₄ , Fe, SO ₄ etc. at Different wavelengths.	PO PO3, 2, PO 4
		Reverse Osmosis Unit (1 No.)	HYDRAPUR E	Removal of ions, molecules and other pollutant from water.	PO1, PO2
		Digital Weigh Balance (4 Nos.)	Sartorius	Measure the quantity of various chemicals	PO1
		Distillation unit (1 No.)		Distilled water required to prepare lab reagents for analysis of different parameters.	PO1, PO4
		Sample preservator (1 No.)	Samsung	To preserve samples	PO4
3	Advanced instrumentation Lab	UV-VIS Spectrophotometer (1 No.)	Varian	Analysis of various parameters at Different wavelength.	PO2, PO3, PO4
		High Performance Liquid Chromatograph (1 No.)	Varian	Pesticide forensics -Organic compounds, Phenolic compounds	PO4, PO5
		Inductively Coupled Plasma emission spectrometer (1 No.)	Horbia Jorbin	Detection of heavy metals in water samples	PO4, PO5

		Vernier Mini Gas chromatograph (1 No.)	Euro	Forensic analyses of organic compound and gaseous samples.	PO4, PO5
		Automatic titrator (1 No.)	MCI	Titration without adding any buffer solution and indicators.	PO3
		Tintometer Calorimeter Model F (1 No.)	Lovibond	Measure the color of water and wastewater.	PO2, PO4,
		Gas Chromatograph	Thermo finnigan	Separate the chemical components of a sample mixture and then detect them to determine their presence or absence and/or how much is present	PO2, PO4, PO5
		Gas purification control panel		Remove the vapours impurities like Moisture, CO, CO ₂ , Hydrocarbon from N ₂ O, Argon & Acetylene	PO2, PO4, PO5
4	CADA Lab	Computers (25 Nos.)	HCL, DELL	Application/simulation softwares, data analysis, e –resources, report preparations.	PO4, PO5, PO6
		Printers (1 No.)	HCL	Print out	PO6
		Softwares		Design- <ul style="list-style-type: none"> • Water supply distribution, • Pumping main, • Water Treatment Plant, Population forecasting, • Sewer Network Simulation/prediction- • Ambient Air quality, • River water quality • Subsurface quality model, • GIS and image processing, etc.	PO4, PO5, PO6
5	Atmospheric Engineering lab	Lux meter (2 Nos.)	INS	Intensity of light	PO1, PO2
		Noise dosimeter (1 No.)	Baseline technologies	Noise level leading to L _{eq} calculations.	PO2, PO4

	High volume air samplers (3 Nos.)	Envirotech APM 430	Analysis of SPM, SO _x and NO _x	PO2, PO3
	Particulate matter PM2.5, PM10 (1No.) Air samplers RSPM (1 No.)	Envirotech APM 550	Analysis of PM2.5 and PM10	PO2, PO3
	Gaseous Sampler Indoor (1 No.)	Envirotech APM 433	Sampling of Air.	PO1, PO4
	Temperature controlled water bath shaker (1 No.)	AMI Scientifics and Services	Adsorption studies for conducting tertiary treatment, microbial culture.	PO1, PO4
	Microbalance	Sartorius	Weighing samples of <2.1 g	PO2
	Gastec Air pump	Gastec	Automatic gas sampling units	PO2, PO4
	Cyclone Separator	-	Air pollution control device that cleanses flue gases of particulate matter	PO2, PO4
	Rotary Shaker	Kemi	Mixing and development of cultures, chemicals, solvents, assays, etc.	PO2, PO4
	Stirrer heavy duty	Elitek	Stirring large volumes under high torque	PO2, PO4
	Sound level meter	Baseline Technologies	Measuring the intensity of noise	PO2, PO4
	High volume Air Sampler	01.Iceno Instruments 02.Netal Chemicals 03.Envirotech	Collection of airborne particulate matter in ambient air.	PO2, PO4
	Stack monitoring kit	Envirotech	Particulate matters (PM)	PO2, PO4
	Lux meter EQ1308		Measuring brightness in lux, fc or cd/m ²	PO2
	VOC Analyzer (1 No.)	Ion Science	Detect VOC in indoor and outdoor air	PO1, PO4
	Microbial Air Sampler (1 No.)	High Media	Microbial sampling of indoor and outdoor air	PO1, PO4
	Vehicle Exhaust Analyzer 1 No.)	QROTECH QRO401	Emission test of vehicles- CO, HC, CO ₂ , & O ₂	PO2
	Hot hair oven (1 No.)	Qesst	Dry heat sterilization.	PO1, PO2

		Hot water bath Shaker (1 No.)	AMI Scientific	Shake and mix samples while maintaining a constant temperature	PO1
		COD digester (1 No.)	Hach	Chemical Oxygen demand in wastewater	PO2, PO4
6.	Microbiology Lab	Bacteriological Incubator (3 Nos.)	Remi	Incubation of microbiological samples	PO1, PO2
		Binocular Microscopes (2 Nos.)	Olympus	Identifying microscopic organisms	PO1
		Stereo Binocular Microscope (1 No.)	Olympus	Study the surfaces of solid specimens in 3D view.	PO1
		Autoclave (2 Nos.)	OMEGA	Sterilization of glass wares, media and other accessories	PO1
		Ordinary Centrifuge (1 No.)	Kemi	Separation of solids	PO1, PO6
		Cooling Centrifuge (1 No.)	Remi	Solids separation from slurry at different temperatures.	PO1, PO6
		Bioreactor/ Fermenter (1 No.)	Sartorius	Bioreactor studies at controlled conditions.	PO4, PO6
		Laminar Flow Cabinet (2 Nos.)	YSI	Microbial studies at controlled conditions	PO1
		Membrane Filter Unit (1 No.)	ROCKER	Filtration of samples	PO2, PO6
		Colony Counter (2 Nos.)	LAPIZ	Counting Microbial Colonies	PO1
		Monoquartz Distillation unit (1 No.)	Borosil	Distilled water preparation	PO1, PO4
		Peristaltic pump (2 Nos.)	Murhopye	Pumping of water and wastewater for lab scale studies	PO4
		Magnetic Filter Funnel 300 ml with Lid	Sarftorius	To measure and concentrate particulate matter in a fluid sample onto a membrane filter or to purify the filtrate.	PO1
		pH Meter (Digital)	Ellico	Measurement of pH value of samples	PO1, PO2
		COD Plus Calorimeter	Lomatte	Measurement of COD value	PO2, PO4
		COD digester (2 Nos.)	Hach	Chemical Oxygen Demand in wastewater	PO2, PO4
		Vertical Auto Clave		Sterilize lab equipment	PO2, PO4
		Membrane Filtration Unit	Rocker	Separation of microbes from the water samples	PO2, PO4

		Peristaltic Pump	Longer Pump	for pumping a variety of fluids.	PO1
		Programmable Pump	Longer Pump	-	PO1
		Vacuum Pump	Alpha	Separation of solids from water samples	PO1
		Bioreactor (5lts capacity)	Sartorius	Bioreactor studies at controlled conditions	PO1
		Cooling Centrifuge	Remi	Separation of mixtures with close densities. Separate immiscible liquids. Sediment suspended solids.	PO1
		Laminar Air Flow Cabinet (2 Nos.)	YSI	Contaminate sensitive processes like plant tissue culture	PO2, PO4

Research Facilities / Centre of Excellence

The laboratories exclusively for research work are developed by senior faculty members involved in outcome based research. The equipment's and instruments in these laboratories are funded by various agencies by way of MRP (Major Research Projects) and is now being used by research scholars and M.Tech students for doing their dissertation work. It is further planned to bring in more external funding in the near future to augment and expand the existing laboratories infrastructure.

Table 2. Details of research laboratories equipment's

Sl. No.	Name of the laboratory	Specialized equipment name	Equipment's details		Utilization details from the perspective of PO attainment
			Make	Application	
1	Electro-chemical R & D laboratory For industrial wastewater treatment funded by UGC, NRB, MoEF, TEQIP	DC Power supply units	Aplabs	Treatment of contaminated waters and industrial wastewaters and electrochemical remediation of contaminated soils and metal recovery	PO2, PO3, PO4
		Hot air oven	Biocare	Sludge drying	PO2
		Muffle furnace	Biocare	Proximate analysis of sludge	PO2

Sl. No.	Name of the laboratory	Specialized equipment name	Equipment's details		Utilization details from the perspective of PO attainment
			Make	Application	
		Digital balance	Shimadzu Japan	Weighing chemicals/electrodes	PO2
		DRB 200 – COD digester	Hach	Water quality parameter - COD	PO2
		Water quality probes	Rugged	Probe for analyzing 3 quality parameters	PO2
		Magnetic stirrers	Bombay	Inductive stirring of reactor content	PO2, PO3, PO4
2	Research laboratory funded by VTU, MoEF & DST.	Ion Analyzer	Hach	Analysis of ions in water and wastewater	PO4, PO6
		COD digester	Hach	Chemical Oxygen Demand in water and wastewater	PO2, PO4
		Gas chromatograph	Shimadzu, Japan Model No.	Forensic analyses of organic Compound and gaseous samples.	PO4, PO6
		pH/ORP Meter	Eutech	Measurement of pH and oxidation reduction potential	PO2, PO4
		DR/5000 Spectrophotometer	Hach	Measure the concentration of a compound in an aqueous solution	PO2, PO4
		Mag. Stirrer with Hot Plate (2lts capacity)	Remi	Create a rotating magnetic field commonly used for micro titration.	PO1
		DC Power Supply Unit	Aplab	Used for electrocoagulation experiments	PO1
		DO Meter with LDO Probe	Hach	Measure the amount of dissolved oxygen in water and wastewater in field.	PO2, PO4
		Field Turbidity Meter	Hach	Measurement of turbidity caused by suspended solid particles	PO2, PO4
		Conductivity Meter	Eutech	Measurement of conductivity	PO2, PO4

Sl. No.	Name of the laboratory	Specialized equipment name	Equipment's details		Utilization details from the perspective of PO attainment
			Make	Application	
3	Advanced instrumentation Lab	BOD Analyser	Hach	Determination of BOD in various wastewater and other water sources.	PO2, PO3
		UV-VIS Spectrophotometer	Varian	Analysis of various parameters at Different wavelength.	PO2, PO3, PO4
		High Performance Liquid Chromatography	Varian	Pesticide forensics- Organic compounds, Phenolic compounds	PO4, PO6
		Inductively Coupled Plasma emission spectrometer	Horiba Jobin	Detection of heavy metals in water samples.	PO4, PO6
		Vernier Mini Gas chromatograph	Trace	Forensic analyses of organic compound and gaseous samples.	PO4, PO6
		Automatic titrator	MCI	Titration without adding any buffer solution and indicators.	PO3
		Tintometer Calorimeter Model	Lovibond	To measure the color of water and Wastewater.	PO3

Lab incharge Staff

No.	Name	Designation and Qualification	Contact No.
1	Meenakshi D. V.	Instructor, DCE.	9663273554
2	Hemalatha Prabhuswamy	Instructor, B.E.	9844942940
3	K. S. Gurupadaswamy	Assistant Instructor, B. Sc.	9611946854
4	Vinod Raj. R.	Instructor, B.E.	8095526414
5	Manjesh	Instructor, Diploma in Civil	8150805519
6	Narasimha	Mechanic, ITI	9481100255
7	Parameshwarappa M	Lab Assistant, PUC	7411588348
8	Shivappa S	Helper	9945752629
9	Nanjaiah	Helper	8147496112
10	Nagamallappa	Helper, ITI	8867636498

ADVANCED INSTRUMENTATION LABORATORY



ATMOSPHERIC ENGINEERING LABORATORY



COMPUTER AIDED DESIGN (CAD) LABORATORY



ENVIRONMENTAL ANALYSIS LABORATORY



ENVIRONMENTAL PROCESS LAB



MICROBIOLOGY LABORATORY

