

**INTEGRAL UNIVERSITY, LUCKNOW**  
**CIVIL ENGINEERING DEPARTMENT**  
**ENVIRONMENTAL ENGINEERING LAB-I (CE310)**

This laboratory provides a scientific and engineering basis for understanding environmental issues and problems. This lab is well equipped with the facilities to impart the experimental knowledge of water, wastewater, air, and noise quality parameters assessment. Learners will be able to determine, explain, analyze and compare various physico-chemical water quality parameters according to the guidelines for drinking water quality code IS-10500:2012. They will be able to learn how to take sample of water and wastewater and to analysis the water and wastewater chemically and physically. Learners will be able to take air sample and analyze them for ambient air and noise pollution.



<b>S.NO.</b>	<b>APPARATUS NAME</b>	<b>IMAGE</b>	<b>DESCRIPTION</b>
1.	TURBIDITY METER	 A photograph of a blue and white turbidity meter. The device has a digital display screen on the left side and several control knobs and buttons below it. The text 'TURBIDITY METER' is printed on the front panel. The device is placed on a light-colored tiled floor.	<b>Turbidity is an optical characteristic or property of a liquid, which in general terms describes the clarity, or haziness of the liquid. Turbidity has always been based on human observation and while this phenomenon is quantifiable by many different means. The unit of turbidity is N.T.U(Nephelometric Turbidity Unit) &amp; J.T.U (Jackson Turbidity Unit)</b>



2.



**pH /mV METER**







**A pH meter is an electronic device used for measuring the pH (Acidity or alkalinity) of a liquid (though special probes are sometimes used to measure the pH of semi-solid substances). A typical pH meter consists of a special measuring probe (a glass electrode) connected to an electronic meter that measures and displays the pH reading**



3.	<b>B.O.D INCUBATOR</b>		<p>An incubator is a device used to grow and maintain microbiological cultures or cell cultures. The incubator maintains optimal temperature, humidity and other conditions such as the carbon dioxide (CO<sub>2</sub>) and oxygen content of the atmosphere inside. Incubators are essential for a lot of experimental work in cell biology, microbiology and molecular biology and are used to culture both bacterial as well as eukaryotic cells</p>
4.	<b>C.O.D APPARATUS</b>		<p>Chemical oxygen demand (COD) test is commonly used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in surface water. C.O.D test is generally use for industrial waste</p>

5.	<b>DIGITAL SPECTROPHOTOMETER</b>		<p>A spectrometer (spectrophotometer, spectrograph or spectroscopy) is an instrument used to measure properties of light over a specific portion of the electromagnetic spectrum, typically used in spectroscopic analysis to identify materials. The variable measured is most often the light's intensity but could also, for instance, be the polarization state. The independent variable is usually the wavelength of the light or a unit directly proportional to the photon energy, such as wave number or electron volts,</p>
6.	<b>DIGITAL PHOTOCOLORIMETER</b>		<p>Digital and Analog Photo Colorimeters, which are one of the precision engineered Colorimeters. Superior quality glass filters that cover the entire visibility ranging between 400 to 700 nm are fixed on the rotating disc. A completely sensitive photo sensor, modern IC technology and various other techniques and features makes these instruments a valuable. For carrying out the analysis, minimum 1 ml. of sample needs to be taken. For enhancing the life of the photocell, an option for switching on the light is provided.</p>



<p>7.</p>	<p><b>HOT AIR OVEN</b></p>		<p>Hot air ovens are electrical devices used in sterilization. The oven uses dry heat to sterilize articles. Generally, they can be operated from 50 to 300 °C (122 to 572 °F) . There is a thermostat controlling the temperature. These are digitally controlled to maintain the temperature. Their double walled insulation keeps the heat in and conserves energy, the inner layer being a poor conductor and outer layer being metallic. There is also an air filled space in between to aid insulation. An air circulating fan helps in uniform distribution of the heat. These are fitted with the adjustable wire mesh plated trays</p>
<p>8.</p>	<p><b>JAR TEST APPRATUS</b></p>		<p>This test provides information on the effects of the concentrations of the coagulants, mixing of the raw water, and the water quality parameters such as pH and alkalinity on the coagulation process. The jar test is often used for the design of treatment facilities.</p>



9.	<b>DESSICATOR</b>		<p>Desiccators are sealable enclosures containing desiccants used for preserving moisture-sensitive items such as cobalt chloride paper for another use. A common use for desiccators is to protect chemicals which are hygroscopic or which react with water from humidity.</p>
10.	<b>AUTOMATIC WEIGHTING MACHINE</b>		<p>Measuring instrument for determining the weight or mass of an object. It is measure .001mg with much accuracy.</p>



<p>11.</p>	<p><b>DIGITAL COLONYCOUNTER</b></p>		<p><b>Digital Colony Counter is designed for quick and accurate counting of bacterial and mould colonies in Petri dishes. Feature packed &amp; easy to use, this is an indispensable bench top tool for the busy microbiologist. It is designed for rapid and accurate counting of bacterial and mould colonies. Simply place the Petridish on the illuminated pad and touch the dish with the pen provided to mark each colony in turn.</b></p>
<p>12.</p>	<p><b>DOUBLE DISTRIATION APPARATUS</b></p>		<p><b>Water distillers produce highly treated and disinfected water for laboratory usage. The distillation process removes minerals and microbiological contaminants and can reduce levels of chemical contaminants.</b></p>

<p>13.</p>	<p><b>GASEOUS POLLULANTS SAMPLER</b></p>		<p><b>Gaseous Pollutants Sampler for indoor/Outdoor Air Quality Monitoring is designed for sampling of various gaseous pollutants. In the sampler air is sucked through suitable reagents that would absorb specific gaseous pollutants like SO<sub>2</sub>, NO<sub>2</sub>, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub> Formaldehyde CS<sub>2</sub> &amp; Mercaptans etc.</b></p>
<p>14.</p>	<p><b>RESPIRABLE DUST SAMPLER</b></p>		<p><b>The instrument is used for the measurement of Suspended particulate matters having size less than 10 microns. Respirable Dust Sampler is supplied with separate Cyclone Assembly along with High Volume Sampler(H.V.S) Unit.</b></p> <p><b>PM<sub>10</sub> is defined as particulate matter (PM) with a mass median aerodynamic diameter less than 10 micrometers (um) – PM<sub>10</sub>.</b></p>



<p>15. <b>SOUND LEVEL METER</b></p>			<p>A sound level meter or sound meter is an instrument that measures sound pressure level, commonly used in noise pollution studies for the quantification of different kinds of noise, especially for industrial, environmental and aircraft noise</p>
<p>16. <b>DECIBEL AUTOCLAVE VERTICAL</b></p>			<p>The autoclave is designed to accommodate a wide range of applications. The user can choose to add the features needed according to the sterilizer's intended use. The advanced laboratory autoclave line is available in an unmatched range of floor standing models with chamber volumes of 23 to 160 liters.</p>

<p>17.</p>	<p><b>MUFFLE FURNACE</b></p>		<p>It is instrument to use for high temperature (i.e. 800 to 1200 OC). it is use for the determination of fix solid and fix volatile solid, it is also use for the ash formation . A muffle furnace (sometimes, retort furnace) in historical usage is a furnace in which the subject material is isolated from the fuel and all of the products of combustion including gases and flying ash</p>
<p>18.</p>	<p><b>DISSOLVE OXYGEN METER</b></p>		<p>It is the apparatus to use to determine the Dissolve oxygen. Dissolve oxygen is oxygen which is present in water. Measure of D.O is also use for B.O.D test also</p>

<p><b>19.</b></p>	<p><b>CONDUTIVITY METER</b></p>		<p>An electrical conductivity meter (EC meter) measures the electrical conductivity in a solution. It is commonly used in hydroponics, aquaculture and freshwater systems to monitor the amount of nutrients, salts or impurities in the water</p>
<p><b>20.</b></p>	<p><b>WATER BATH</b></p>		<p>A container of water heated to a given temperature, used for heating substances placed in smaller containers. It is used to incubate samples in water at a constant temperature over a long period of time. All water baths have a digital or an analogue interface to allow users to set a desired temperature. Utilisations include warming of reagents, melting of substrates or incubation of cell cultures. It is also used to enable certain chemical reactions to occur at high temperature. Water bath is a preferred heat source for heating flammable chemicals instead of an open flame to prevent ignition</p>