

Annexure -5

List of Equipment Required by Department of Environmental Science, IGNTU

S.No	Equipment	Quantity
1	BOD incubator	1
2	Flame photometer	1
3	Autoclave	1
4	Laminar Air Flow	1
5	Fume hood	1
6	UV-visible spectrophotometer	1
7	Gas burners	10
8	Spirit Lamp	10
9	Wood grinder	1
10	Nephelometer	1
11	pH meter	2
12	Colorimeter	1
13	Electronic balance	2
14	Water Bath	1
15	Hot air oven	1
16	Centrifuge	1
17	GPS	1
18	Digital Inclinator	1
19	Tree Increment Borer	1
20	Laser Ace Hypsometer	1
21	Digital Rotameter	1
22	Muffle Furnace	1
23	Kjeldhal Apparatus	1
24	Digital Thermohygrometer	3
25	Sechhi Disc	2
26	Soil Augur	2
27	De Ionizer	1
28	Bomb calorimeter	1
29	Sound level meter	1
30	High volume sampler	1

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Specification of Equipments Department of Environmental Science, IGNTU

S.No	Equipment	Technical Specification
1	BOD incubator	Dimensions 505 x 830 x 415 mm, 20 x 34 x 17 inch, Temperature control, Capacity : 250 Ltrs, Shelves : 03 nos., Shelves made of stainless steel (Adjustable type), Temperature range : 0 – 600 C, Accuracy ± 0.5 0 C Digital PID controller for Precision Temperature control Equip with wait- off timer, high temperature alarm, Auto-tuning and temperature calibration function Double door with magnetic packing
2	Flame photometer	Resolution 0.1 ppm/meq, Sensitivity Na:0.5 ppm, K:0.5 ppm, Li:0.5 ppm, Ca:15 ppm Dimension 365 x 245 x 220 mm, Display 20 x 4 Alphanumeric backlit LCD display Power 230 V + 10% AC, 50 Hz
3	Autoclave	60 L, diameter 250mm, depth 450mm, Automatic pressure control
4	Laminar Air Flow	<ul style="list-style-type: none"> • Size: 1200W X 600D X 600H, Complete stainless steel structure, With acrylic glass door and U.V. light, Cock for gas and vacuum line, High efficiency HEPA and blower
5	Fume hood	<ul style="list-style-type: none"> • Metal: Prime furniture steel, free of scales. • Safety Glass: 1/4" Laminated; conforming to Safety Glazing. • PVC: Extruded Polyvinyl Chloride . • Resin-Chem: White chemical resistant, fiberglass reinforced thermostat resin sheet.
6	UV-visible spectrophotometer	Wavelength range 190 nm – 1100 nm Spectral Bandwidth 1 nm, Resolution 0.1 nm Wavelength accuracy UV/VIS region: ± 0.3 nm Wavelength repeatability UV/VIS region: less than ± 0.3 nm, Stray light < 0.02% (220 nm, NaI) < 0.02% (340 nm, NaNO ₂) < 1.0% (198 nm, KCl), Noise level < 0.00005 Abs Photometric System Double beam, Photometric accuracy ± 0.002 Abs at 0.5 Abs; ± 0.004 Abs at 1.0 Abs; ± 0.006 Abs at 2.0 Abs Photometric range -3 to 3 Abs Photometric repeatability < ± 0.002 Abs at 0.5 Abs < ± 0.001 Abs at 1 Abs < ± 0.003 Abs at 2 Abs, Baseline stability < ± 0.003 Abs/Hr Baseline flatness < ± 0.0006 Abs (190 nm – 1100 nm, one hour after light source turned on), Detector Silicon photodiode, Light source 20 W halogen/D2 lamp
7	Gas burners	Metalic
8	Spirit Lamp	Stainless steel : 4 mm diameter
9	Wood grinder	Length wheeled: 33'8" Height wheeled: 11'6" Width wheeled: 7'10" Length tracked: 30" Height tracked: 11'6"



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		<p>Width tracked: 8'6"</p> <p>Gross weight wheeled: 30,660 lbs.</p> <p>Axle weight: 23,920 lbs.</p> <p>Tongue weight: 6,720 lbs.</p> <p>Gross weight tracked: 32,400 lbs.</p> <p>Engine: CAT, Cummins or John Deere</p> <p>Horsepower: 150 HP to 325 HP</p> <p>Fuel capacity (tank): 90 gallons</p> <p>Hydraulic oil capacity: 92 gallons</p> <p>Dust suppression system</p> <p>Manually operated debris containment door</p> <p>Remote control with tethered remote back-up system</p>
10	Nephelometer	<ul style="list-style-type: none"> • Range: 0-1000 NTU with 0.01 NTU resolution • Pre-programed calibration procedure • High performance results due to two detectors optical system and signal averaging. • Battery and optional AC adaptor capability • Data logging and optical USB capability <p>Direct digital read out in NTU.</p>
11	pH meter	<p>Measuring range: 0 to 14.0pH</p> <ul style="list-style-type: none"> • Accuracy: ± 0.2pH • Resolution: 0.1pH • Sample's temperature: 5 °C to 40 °C • Power: Lithium battery (CR2032 DC 3V)$\times 2$, continuously use more than 150 hours • Dimension: bench type
12	Colorimeter	<p>Photometric Methods Single beam, diffraction grating, Spectral Bandwidth Wavelength Range 325 nm-1000 nm Wavelength Accuracy 0.3 %T 340nm</p>
13	Electronic balance	<p>Electronic analytical balance with 7-segment display, stability indicator and selectable filter levels, plus optimized display update rate</p> <p>Weighing capacity : 210 g</p> <p>Readability : 0.1 mg, Tare range (subtractive) : 210 g</p> <p>Repeatability : 0.1 mg, Linearity : 0.2 mg</p> <p>Pan size (diameter) : 90 mm, Bal. housing (WxDxH) : 200x270x299 mm, Weighing chamber (WxDxH) : 165x138x220 mm</p>
14	Water Bath	<ul style="list-style-type: none"> • Digital temperature control with indicator light • LED screen which constantly displays the temperature in °F or °C • Maintains temperature of 32°C to 80°C, Stainless Steel • Removable stainless steel pan • Accommodates Hanau water bath pan • Unit stops heating when pan is removed
15	Hot air oven	<ul style="list-style-type: none"> • Capacity : 150 Ltrs. • Shelves : 02 nos. Shelves made of stainless steel (Adjustable type) • Internal Dimension (LXWXD) : (560x450x600) mm • Temperature range : Ambient + 100 C to 2500 C • Control Accuracy : ± 0.2 C <p>Uniformity : ± 2.0 C or better</p>



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		5. Digital PID controller for Precision Temperature control
16	Centrifuge	<ul style="list-style-type: none"> • Max RPM : 14,800 RPM, Max RCF : 21, 100 X g, • Max capacity : 1.5 m (2.0 ml)x 12 tubes • Control : Digital Feedback control with jog shuttle, Switch(turn+ push) • Display : Digital back – tight LCD • Timer : 99 min. 59 sec. continuous mode • Noise level : ≤ 57 dB • Temperature Range: set from -9⁰ C to +40⁰ C
17	GPS	Garmin Etreax 30
18	Digital Inclinator	NS-15/DMG 2X
19	Tree Increment Borer	<ul style="list-style-type: none"> • Haglöf 4" Replacement Steel Bit, 3-Thread, .200" (5.15mm), Teflon • Features a core diameter of 0.200" (5.15 mm) and a 3-thread design for easy penetration. Constructed of quality Swedish steel. • Drilling depth: 400 mm • Bit: 3-spirals • Diameter core: 5,0 mm
20	Laser Ace Hypsometer	<ul style="list-style-type: none"> • Log tapering factors. • Onboard data storage). • Use with or without remote targets. • Critical range gating for area plots. • Class 1 eyesafe laser distance meter (FDA/ IEC) • Digital inclinometer - LCD graphics screen Bluetooth® or RS232 data communication. • Range passive to 150m/ 500ft. • Accuracy 5cm/ 2" Weight 14oz/ 400g - Size: 110 mm/ 4.33" L x 100mm/ 3.94"W x 50mm/ 1.97" H
21	Digital Rotameter	<p>Accuracy - ± 2% of FSD</p> <p>Tube Body Construction - Moulded polycarbonate</p> <p>End connectors - ABS</p> <p>O-Ring Material - Nitrile</p> <p>Float Material - SS316/PVC</p> <p>Temperature Limit - 70°C</p> <p>Test Pressure - 10Kg /cm2</p>
22	Muffle Furnace	<ul style="list-style-type: none"> • As per GMP Rule outer Body made of S.S.304 of thick plate in dual finish. • Inner of ceramic Muffle • Max Working Temp.1160C • Supplied with PID controller with auto tuning facility with double display to view set & present temp. • Door insulation of HFK briks • Heating element are mafe from kanthal A 1 Wire • A uniform distribution from all 4 sides • A special type of thermocouple fuse to avoid over heating • Power supply 230 Volts 50 HZ



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