

[FSC]

Department of Forensic Science, Gujarat University

UGC 12th Plan Proposed Purchase of Equipment's with specifications

Item No.	Equipment/Software	Specification
1.	Spectrofluorometer	<p>Single compact instrument for both fluorescence spectrometer and UV/Vis spectrometer allowing quantification of sample volumes from 'microlitres to millilitres', with at least 100 installations of BioSpectrometers.</p> <p>Fluorescence spectrometer mode (Specifications):</p> <ul style="list-style-type: none">• System should be capable of determining very low concentration of biomolecule using fluorescent dyes, with an excitation wavelength of 470 nm and emission wavelengths of 520 and 560 nm• Must allow to choose up to 12 standards for standard curve calibration with curve fit analysis viz., regressions (linear, cubic & quadratic) and interpolations (linear & spline)• Number of sample data display graphically should not be restricted• Should allow using conventional visible cuvette with volume range starting from 50 μL and NOT special or specific tubes• Should have in-built pre-programs for nucleic acids and protein quantification by fluorescence intensity using dyes such as PicoGreenR, OliGreenR, RiboGreenR and NanoOrangeR.• Fluorescence intensity should be across a range of 0.5 nM - 2,000 nM fluorescein• Should be compatible with microliter measuring cells and standard cuvettes• Detection limit for dsDNA should be 1 pg/μL• Measuring principle should be confocal filter fluorimeter with reference beam• Should have the combination of LED as light source along photodiodes as beam receiver• Should have excitation wavelength 470 m with 25 nm bandwidth• Should have emission wavelengths 520 nm with 15 nm bandwidth and 560 nm with 40 nm bandwidth

- Random error should not exceed \pm 2% at 1 nM fluorescein (emission wavelength 520 nm)

UV/Vis Spectrometer mode (Specifications):

- System have pre-programmed methods for rapid and reliable analysis of Nucleic acids and proteins, OD600, dye methods (parallel measurement of biomolecule and dye label), FOI (frequency of incorporation) calculation.
- Should allow measuring and recording of UV/Vis spectral wavelengths from 200 to 830 nm, with smallest increment: of 1 nm
- Should allow extinction measurement for one or several wavelengths
- Should allow using sample volume \geq 2 μ L.
- Must be supplied with 200 numbers of plastic cuvettes to handle minimum of 50 μ L.
- Recording of wavelength scans should be possible with Integrated data processing
- Should have in-built methods with analysis via factor, standard or standard series
- Should allow performing Dual-wavelength method with subtraction and division analysis
- Should have data evaluation methods for concentration via standard series (Regression: linear, cubical, Quadratic) and (Interpolations: linear and Spline)
- Should have freely selectable wavelengths providing maximum flexibility for all current and future applications
- Should have Spectra Zoom R technology to analyse and process curve sections in detail view directly on the instrument display and for peak detection
- Should have the combination of Absorption single-beam spectrophotometer with reference beam as measuring principle with Xenon flash lamp as light source and beam receiver as CMOS photodiode array
- Spectral band width should be $<$ 4 nm
- Photometric measuring range should be 0 A to 3.0 A at 260 nm
- Random error should be \leq 0.002 if A = 0, \leq 0.005 (0.5 %) if A = 1
- Systematic error should be \pm 1% if A = 1

Additional System features:

		<ul style="list-style-type: none"> • System should be small, lightweight, mobile and should be easy to operate with its integrated 5.7 inch color display in combination with the keys of the device • Data transfer of measured data to a PC by connecting the device directly to a PC should be possible without any additional software or should be through USB stick • Should have guided software sequence to minimize errors • Should allow direct operation on the device and must not require PC to operate • Should have facility for saving > 1,000 measured results in the instrument directly • Should allow user to program and save > 100 new methods • Light beam height should be 8.5 mm • Cuvette shaft should have dimension of 12.5 mm x 12.5 mm, allow using Quartz/ UV transparent plastic cuvettes (UV range); Glass / plastic cuvettes (visible range) and micro-volume cuvettes • Display should be VGA TFT-5.7" • Power consumption should be as low as 15 W during operating step • Power supply: 100 – 240 V, 50 – 60 Hz • Should weigh 5.4 kg • Dimensions (W × D × H) in mm: 295 × 400 × 150
2.	Digital Fluorimeter	<ul style="list-style-type: none"> ▪ Digital photo fluorimeter ▪ Range : 0 to 0.2. 2.20 & 200 pm ▪ Detector:photo diode ▪ Light source: Mercury vapour lamp
3.	Matlab & Simulink Software	MATLAB software with Image processing toolbox and Neural network toolbox.
4.	PCR	<p>SPECIFICATION 96 WELL PCR</p> <ul style="list-style-type: none"> • The system should be a 96 well Thermal Cycler with 6 separate peltier blocks to provide independent temperature zones to run – six different assays with varying annealing temperatures at the same time. • Veriflex Blocks on the Veriti Thermal Cycler provide a better than gradient approach to PCR optimization. With six separate Peltier Blocks, one can precisely set and control the temperature in each block. • Veriflex blocks maintain their thermal characteristics between optimizing and isothermal conditions, eliminating the need for optimization steps. • Incubate samples at six different temperatures

		<p>simultaneously.</p> <ul style="list-style-type: none"> • Each block to accommodate 16 wells and having the ability to set up PCR with a specific temperature differential of up to 5 degree centigrade between blocks. • Run up to 6 separate temperatures in the same plate with user defined time to determine the optimal annealing temperatures. • On board Tm calculator facility to approximate the optimal annealing temperature. • The system should provide for Standard and fast run modes in a single instrument with the ability to use 0.2ml / 0.1ml PCR tubes or micro-well plates. • The system should support PCR volumes ranging from 10 to 80 µl • Mouse or stylus free navigation capability with VGA colour touch screen allowing for easy intuitive graphical user interface programming. • Choice of saving the methods up to 800 to the instrument or unlimited to a USB memory stick. • Programmable heat lid cover from 50 degree to 105 degree centigrade for efficient PCR optimization. • Scalability: capability to interlink up to 11 PCR systems via single Ethernet hub. • Security: The system should have the ability to store methods on a memory stick. • Portability: The system should have a USB port to transfer methods from one machine to another. • The system should allow easy product updates via USB port. • The machine should be duly certified / authorized for PCR process and the vendor should produce the certificate for the same. • All necessary optimized reagents and plastic ware for standard and fast thermal cycling should be made available by the vendor. • The Instrument must be provided with two years of comprehensive warranty.
5.	Furnace	<ul style="list-style-type: none"> ▪ Muffle furnace 1450 Degree C. ▪ Chamber size 6"6"x10"(L) . ▪ Temp. Accuracy +/- 2 degree C throughout the chamber. ▪ Total heating load 6.0 Kw.
6.	HPLC	<ul style="list-style-type: none"> • Quaternary Gradient Pump with Flow rate range :0.001 ml/min to 5ml /min,

		<ul style="list-style-type: none"> • Flow rate accuracy :+ 1 % • Flow Precision : + 0.075 % RSD • Gradient Programming up to 4 Solvent • Auto Sampler with Cooler • Injection Volume Accuracy : +1 % • Column oven should accommodate at least 2 nos of Columns, • Temperature range Should be 15 deg below ambient & up to 60 deg C • UV-VIS Detector • Wavelength range 190- 600 nm • Wavelength accuracy + 1 nm reproducibility : + 0.1 nm • Workstation Software
7.	Polarizing Microscope	<ul style="list-style-type: none"> • Universal infinity color corrected optical system & Anti-Fungal Lense • Microscope should be feel full Application of Simple polarizer Analyzer • 30°inclined Seidentopf Binocular head • High eye point wide-field plan eyepiece 10X/20mm, with adjustable diopter • Nosepiece Reversed Quadruple nosepiece • Coaxial focus system with tension adjustable with upper limit and tightness adjustment. • Real professional Infinity plan achromatic phase objective 4X/0.10, 10X/0.25, 40X/0.65, 100X/1.25 • Condenser : N.A.1.25 Koehler illuminatory condenser with socket for phase contrast and dark field accessories • Stage: 140mmx132mm Double layer mechanical stage with underhand, move range 76X50mm, precision 0.1mm. • 100V-240V fluctuate of voltage, single high brightness 3W LED (predetermine filament center) with continuous intensity control. • Safety handle design • The security design of preventing faulty operation. • Microscope should be upgradable to Phase Contrast, Dark field attachment. • Products should be ISO 2008:9001 and CE Certified. • Objectives should be imported quality. • 5 Mega pixel Color digital cameras with common software.