CENTRAL INSTRUMENTATION CELL

ESTABLISHMENT:- ***Central Instrumentation Cell (C.I.C.) has been established and started functioning since January 2002 in the University as an Academic Service Unit.***

IN-CHARGE : - Dr. P.A. Gawande [Assistant Professor Department of Botany]

CO-COORDINATOR :- Dr. Mrs. Ranjana D. Raut [Associate Professor Department of Electronics]

OBJECTIVES:-

- To acquire and maintain sophisticated instruments, computers software for undertaking quality research programs under one roof.
- To render analytical services / research facilities to the researchers, students and industrial personnel.
- To facilitate testing, calibration and standardization to the aspirant users.
- Organization of training programs, workshops and expert lectures with a view to foster repair and maintenance of scientific instruments and electronic hardware.
- To avoid duplication of costly equipments in various departments

Analytical Instrumentation Facilities:

(1) **GAS LIQUID CHROMATOGRAPH**
(MODEL: AUTO SYSTEM XL, M/S PERKIN ELMER, USA).

The auto system XL oven is designed to provide easy access to columns. The oven gives excellent temperature control and fast cool down times for maximum productivity. All Temperatures and time function are microprocessor controlled and are shown on the vacuumed fluorescence display. Software selectable coolant time out and coolant cut in temp. ensure economic, sub ambient operation.

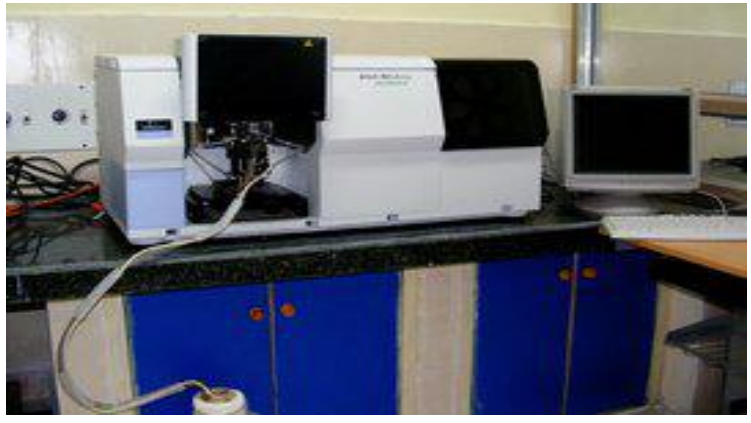
Applications : The auto system XL supports a comprehensive array of injectors that provides accuracy & precision to sampling applications. Separation and analysis of organic compounds, Testing purity of compounds, Determine relative amounts of components in mixture, Compound identification, Isolation of pure compounds (micro scale work)

(2) **ATOMIC ABSORPTION SPECTROMETER**
MODEL: AA300, M/S PERKIN ELMER, USA)

The Analyst 300 is a computer controlled atomic absorption system providing automatic sequential multi element analysis capabilities. A superior high dispersion mono-chromator with large dual blazed grating provides excellent light through out for high-energy efficiency over the entire wavelength range; high sensitivity photo multiplier detector complements the optics.

The spectrum range is 185-860 mm with the automatic wavelength selection with no normal intervention and hence no errors. The AA 300 is equipped with a large grating of 64/72 mm blazed at 2 different wavelength in visible and UV region which gives uniform energy over entire spectral range.

Applications: Major and trace element analysis in Agriculture, Environment, Food product, Forensic science, Geochemistry, Metallurgy, Petrochemicals, Paints, Oils, Plastics, fibers, Pharmacological and Cosmetics.



(3) UV-VISIBLE SPECTROMETER
(MODEL: LAMBDA 25, M/S PERKIN ELMER, USA)

The Lambda 25 UV-visible spectrometer is provided with double beam optics, which incorporates concave holographic grating along with a proven optical design to minimize stray radiation with accurate results. The system has a noise specification of 0.000 3A peak to peak, which means that 0.003A is the lowest usable absorbance reading. The optical performance of the lambda series ensures that you will get dependable results at high and low absorbance values with consistently good quality data. The system is PC controlled by UV-winlab software, which makes it easy to perform analysis. its wavelength range is 190-1100 nm.

Applications: Identify an unknown compound by a comparative analysis. Determine the concentration of a chromaphore compound, Absorbance of the unknown can be measured, Transmission of the unknown can be measured.

(4) TRINOCULAR POLARISINGMICROSCOPE
(MODEL: AXIO LABPOL, M/S CARL-ZEISS, GERMANY)

The Axiolab p01 Trinocular polarizing microscope has superb true quality eyepieces providing brilliant, flawless images created by the best optics Carl-Zeiss can offer. ICS, the infinity colour corrected system with objectives for transmitted and reflected light and an eye friendly 20mm field of view. The optional objective provides an overview of a specimen area as large as 16 mm. The ICS objectives ranges from low priced Achromat P01 for teaching use to the research grade plan.

Applications: Polarization contrast lets you characterize hair, earth and fiber microstructure in forensic examinations of criminological samples. You analyze lacquer and paint chips using bright field, fluorescence and polarization microscopy. If you work as a geologist, you examine rock sections and mineral samples, for example, for oil production. In environmental protection, you identify the microstructure of materials such as asbestos fibers.

(5) TRINOCULAR FLUORESCENCE MICROSCOPE
(MODEL : AXIOSTAR PLUS, M/S CARL-ZEISS, GERMANY)

The Axiostar plus fluorescence module has linear slider with three-filter position, which is ideal for single and double stained fluorescence in immuno fluorescence, or with simple FISH applications. HBO light source provide the right spectral light intensity and the integrated light trap guarantees high contrast images.

Applications: They are used in the study of both organic and inorganic matter. It uses the release of **light** by a stained substance that has taken in either light or other electromagnetic radiation. Fluorescence Microscopes use an extremely high intensity light to generate an image to illuminate the sample being studied. This release of light has a longer wavelength, which is what causes the fluorescence in the sample. Various stains are used in conjunction with the specimen in order to facilitate the fluorescing process. Fluorescence Microscopes are most commonly used for biological **research**, environment monitoring, public health and medicine. One of the greatest advantage of Fluorescence Microscopes is that it enables the viewer to obtain faster **laboratory** results that would not be seen under a routine light microscope.

(6) FTIR SPECTROPHOTOMETER
(MODEL : 1600, M/S PERKIN ELMER, USA)

FTIR spectroscopy provides structural information of the samples. The low energy infra red radiations are appropriate to execute molecular vibrations. The absorption of energy causes the bonds between atoms to be executed to higher energy levels. This results in absorption bonds of specific frequencies. From these characteristic bands, one can determine a great deal about the structure of a molecule. Thus, IR spectra provide strong evidence for compound. Solid samples are analyzed in KBr matrix. Liquid samples in decomposable cells and gases in gas cells at required pressure. Sample required is 50mg.

Applications: Identification of compounds, their purity composition of mixtures. The system can be utilized for Pharmaceutical research, Forensic investigations, Polymer analysis , Lubricant formulation and fuel additives Foods research, Quality assurance and control , Environmental and water quality analysis methods , Biochemical and biomedical research, Coatings and surfactants

(7) MINI SPIN SPINNER MAGNETOMETER
(MODEL: MS1, MIS MOLSPIN LTD, UK)

The Mini spin is a low cost, high sensitivity portable slow speed fluxgate magnetometer. It is of rugged construction, battery or mains powered and it may there fore be used either in the field or in the laboratory. Specimens are spun at 6 Hz about a vertical axis inside a triple - shielded, annulus - shaped fluxgate, the output from which may be integrated over 6 or 24 seconds. The results are displayed as two orthogonal components of magnetization on a 5-digit liquid crystal panel. Integration is effected digitally and the magnitude and phases of the signal are extracted by Fourier analysis Specimen size upto 1- inch (2.54 cm) cylindrical specimen integration time either 6 seconds (24 spins) or 24 seconds (120 spins).

Applications: Mini spin spinner magnetometer is useful in determining the various parameters like declination, inclination and magnetic intensity which are necessary for determining Natural remnant Magnetization of a natural solid materials (i.e., Rocks).

(8) LYPHOLIZER
(MODEL: LYOLAB 3000, M/S HETO HOLTEN, DENMARK).

LYOLAB 3000 is a new generation freezer dryer with unique twin capillary tube system based on a twin cooling performance thus giving fastest drying times. The full condenser surface is used optimally securing extra-ordinarily high throughput. The digital temperature readout provides easy to read and accurate indication of condenser temperature below - 55CC (@ ambient of ÷20C) on the Lyolab 3000 front panel. Combined with the multi-colour Alarm wait OK (AWO) indicator, it ensures a safe and optimal run thus avoiding possible loss of samples.

Applications: The Lyolab 3000 is the first in a new generation featuring state of the art laboratory freeze drying technique perfectly suitable for Pharmaceutical preparations, food materials (eg. Beverages- fruit) dairy products, museum objects, microorganisms (e.g. bacteria, yeast), virus, vaccines and antitoxins, blood fractions, enzymes, vitamins, biological reagents and standards.

(9) BINOCULAR STEREO ZOOM MICROSCOPE
(MIS OLYMPUS, JAPAN)

The binocular stereo zoom microscope is supported by GSWH lox eyepiece with excellent quality optics, the objective guarantee brilliant colour corrected and high contrast results.

Applications: The binocular stereo zoom microscope is a piece of precision equipment from Olympus, Japan utilized for studying the detailed morphological characters of various specimens which is widely used in clinics, laboratories, biology, chemistry, environmental science, geology, medicine and pharmacology.

(10) PRECISION IMPEDANCE ANALYZER
(MODEL: 4294A M/S AGILENT, USA)

The 4294A covers a broader test-frequency range (40 Hz to 110 MHz) with Basic impedance accuracy:+/-0.08 %. Excellent High Q/Low D accuracy enables analysis of low-loss components. The wide signal-level ranges enable device evaluation under actual operating conditions. The test signal level range is 5m V to 1 Vrms or 200 uA to 20m Arms, and the DC bias range is 0 V to +/-40 V or 0m A to +/-100m A. Advanced calibration and error compensation functions eliminate measurement error factors when performing measurements on in-fixture devices.

Applications : The 4294A is a powerful tool for design, qualification and quality control, and production testing of electronic components. Circuit designers and developers can also benefit from the performance/functionality offered.

(11) FLOID CELL IMAGING STATION
(LIFE TECHNOLOGIES **U.S.**)

The FLoid® Cell Imaging Station is an affordable, user-friendly imaging solution for the quick detection and verification of fluorescently-labeled samples. The FLoid® Cell Imaging Station captures transmitted light and three-color fluorescent images of your cells and samples right at your bench top. An uncomplicated user interface, streamlined image acquisition process, and real-time, multicolor display allow even imaging novices to produce high-quality images with a few mouse clicks.

Applications: Cell Analysis, Cell Culture & Transfection, Cell Engineering & Genome Editing, Cloning, DNA & RNA Purification, Gene Expression Analysis & Genotyping, PCR, Protein Expression & Analysis, Real-Time PCR RNAi Sequencing

(12) Cytometer
(LIFE TECHNOLOGIES **U.S.**)

The Tali® Image-Based Cytometer is a benchtop assay platform that produces highly accurate, statistically significant three-parameter population analysis and cell counting in typically less than 1 minute per sample. Using state-of-the-art optics and image analysis software, the Tali® Image-Based Cytometer performs suspension cell-based assays, including cell counting, cell viability, fluorescent protein expression, and apoptosis assays.

Applications: Biosynthesis, Cell Biology, Cell Health, Immunology, Screening, Stem Cells, Immunophenotyping , Cell Sorting , Cell Cycle analysis, Apoptosis, Cell Proliferation Assays, Intracellular Calcium Flux