

Report on Two-Day Hands-on Training Program on “Modern Analytical Techniques” and “Microscopy & Herbal Extraction Techniques” at ICFAI School of Pharmaceutical Sciences, ICFAI University, Jaipur

Date: 23–24 July, 2026

Time: 10:00 A.M. onwards

Venue: ICFAI School of Pharmaceutical Sciences, The ICFAI University, Jaipur

Organizing Unit: ICFAI School of Pharmaceutical Sciences, The ICFAI University, Jaipur

Objectives of the Program

- To provide pharmacy students with direct, hands-on exposure to key analytical instruments used in pharmaceutical quality control and research.
- To familiarize participants with microscopy techniques and classical as well as modern methods of herbal extraction.
- To bridge the gap between theoretical classroom learning and practical laboratory competence.
- To strengthen inter-institutional academic engagement by inviting participation from pharmacy students beyond ISPS.
- To sensitize students to laboratory safety protocols and standard operating procedures for instrument handling.

Overview

ICFAI School of Pharmaceutical Sciences, Jaipur, organized a two-day, hands-on training program at the Central Instrumentation Research Laboratory and the Pharmacognosy Laboratory, comprising two parallel skill-development workshops — “**Modern Analytical Techniques**” and “**Microscopy & Herbal Extraction Techniques**.” The program was conceived to address a recurring gap in pharmacy education: while analytical instrumentation and extraction methodology are taught extensively in theory, undergraduate and postgraduate students often have limited direct, unsupervised access to the instruments themselves. By running two simultaneous, instrument-focused tracks, the program allowed a larger number of students to obtain hands-on laboratory exposure within a compact two-day window, without diluting the depth of engagement in both workshops.

The program was open to pharmacy students up to the postgraduate level, reflecting the program's inter-institutional academic outreach objective. Registration was conducted free of cost through a QR-code-based online form circulated in advance among neighbouring institutions, with seats allotted on a first-come-first-served basis to ensure equitable access and manage laboratory capacity.

Inaugural Session

The program commenced at 10:00 A.M. on 23rd July, 2026, with a formal welcome address delivered by Ms. Sakshi Priya, Assistant Professor and Coordinator of the workshop, who outlined the day's proceedings and introduced the two parallel workshop to the assembled students. This was followed by the blessings and formal remarks of **Prof. (Dr.) G. N. Sharma**, Principal, ICFAI School of Pharmaceutical Sciences, Jaipur, who briefed the gathering on the objectives, two-day schedule, and expected learning outcomes of the training program. Prof. Sharma emphasized the institution's continued commitment to experiential, laboratory-based learning as a complement to classroom instruction, and encouraged participants to engage

actively with the hands-on sessions and use the opportunity to clarify long-standing conceptual doubts directly at the instrument bench.

Followed by the inaugural session, participants were divided between the two workshops based on their prior registration, and were briefed on the respective laboratory locations, safety requirements, and the format of the sessions to follow, before proceeding to their designated laboratories.

Workshop I: Modern Analytical Techniques

Coordinated by **Ms. Sakshi Priya**, this workshop offered expert demonstrations followed by guided, hands-on operation of key laboratory instruments used routinely in pharmaceutical quality control and research, including the:

- **Microprocessor Single Beam UV-Spectrophotometer:** used for quantitative estimation of drug substances and assay procedures based on absorbance measurements.
- **Digital Photo fluorometer:** used for fluorescence-based estimation of compounds present in trace quantities.
- **Nephelo-Turbidometer:** used for turbidity and light-scattering-based measurements relevant to solution clarity and particulate testing.
- **Digital pH Meter:** used for precise pH determination and calibration checks central to formulation and quality-control work.
- **Ion Exchanger:** used to demonstrate ion-exchange principles applied in water purification and pharmaceutical separation processes.

For each instrument, students were first taken through a faculty-led demonstration covering the underlying working principle, followed by supervised, hands-on operation in small groups so that every participant obtained direct console time rather than observing passively. Sessions were structured around live calibration exercises, step-by-step operating demonstrations, and interactive question-and-answer discussions, allowing participants to build direct familiarity with instrument handling rather than relying on textbook description alone. Common sources of measurement error, routine maintenance practices, and troubleshooting checks for each instrument were also discussed.

Workshop II: Microscopy & Herbal Extraction Techniques

Running in parallel and coordinated by **Ms. Ayushi Rawat**, this workshop introduced participants to the Soxhlet extraction apparatus and Clevenger apparatus through live, hands-on assembly and operation, along with section-cutting and staining methods used in pharmacognostic identification of crude drugs. Students were guided through setting up the Soxhlet apparatus for continuous solvent-reflux extraction and the Clevenger apparatus for volatile-oil determination, and were shown how to identify a properly functioning extraction cycle and troubleshoot common assembly errors.

On the microscopy side, participants practiced transverse and longitudinal section-cutting of plant material by hand, followed by staining using standard pharmacognostic reagents to bring out diagnostic tissue features, and were guided in mounting and observing their sections under the microscope to identify characteristic cellular and tissue markers used in crude-drug authentication.

Participants were also walked through the various categories of classical and modern extraction techniques and their comparative principles, including:

- **Maceration:** prolonged soaking of crude drug in solvent at room temperature, suited to thermolabile constituents.

- **Infusion:** short-duration extraction using hot or cold solvent, typically for readily soluble constituents.
- **Decoction:** extraction by boiling the crude drug in water, used for heat-stable, water-soluble constituents.
- **Digestion:** extraction with gentle heating over a prolonged period to improve solvent penetration.
- **Percolation:** continuous passage of fresh solvent through a column of crude drug for more exhaustive extraction.
- **Soxhlation:** continuous, solvent-recycling extraction using the Soxhlet apparatus, suited to thermostable constituents requiring exhaustive extraction.

Each technique was discussed in terms of its underlying mechanism, typical solvent systems, and its relevance to isolating bioactive compounds from crude drugs, giving participants a working understanding of how extraction method selection affects yield, compound stability, and extract quality in pharmacognostic practice. The session also touched on basic quality-control parameters used to evaluate finished extracts, such as extractive value and physical characteristics.

Participant Compliance and Engagement

Throughout both days, participants were required to bring and wear their own lab coat, face mask, and head cover, in line with workshop safety guidelines. Both sessions saw active, sustained participation, with students engaging directly with the instruments and apparatus under close faculty supervision, and using the interactive discussion segments to clarify conceptual and procedural doubts.

Valedictory Session

The program concluded with a valedictory session, during which Certificates of Participation were distributed to all students who successfully completed the two-day training. The session closed with a formal vote of thanks extended to the organizing team, resource persons, and participating students for their support in the successful conduct of the event.

Outcomes

- Participants gained direct, supervised operating experience on analytical and extraction instrumentation not otherwise accessible in routine classroom teaching.
- Students developed practical competence in microscopy-based section cutting and staining, and in classical and Soxhlet-based extraction methodology.
- The program strengthened ISPS's academic outreach, drawing participation from students of other pharmacy institutions in addition to its own.
- Participants gained improved confidence in the calibration and operation of standard pharmaceutical analytical instruments.
- Certificates of Participation were issued to all students who successfully completed the training, providing a documented record of skill enhancement.
- Feedback gathered during the interactive Q&A segments highlighted specific areas — such as calibration troubleshooting and solvent selection for extraction — that ISPS may consider expanding upon in future sessions or dedicated follow-up workshops.

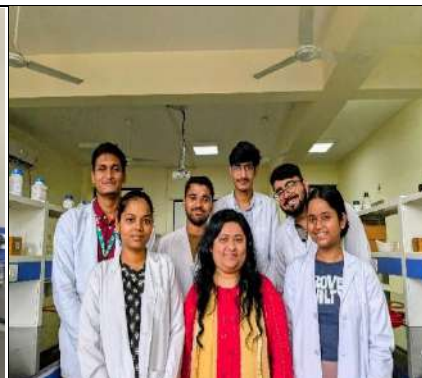
CONCLUSION

The two-day training program successfully met its stated objectives, providing pharmacy students with structured, supervised exposure to instrumentation and techniques that are central to both pharmaceutical

analysis and pharmacognosy, but that are difficult to cover in adequate depth within regular classroom hours. The parallel-track structure, coordinated respectively by Ms. Sakshi Priya and Ms. Ayushi Rawat, ensured that participants received focused, hands-on attention despite the scale of participation. The program also reinforced ISPS's role as an active contributor to regional pharmacy education through its willingness to open specialized laboratory training to students from partner institutions. Building on the positive response to this edition, ISPS may consider conducting similar hands-on training programs on a recurring basis, potentially expanding the range of instruments and techniques covered in future iterations.

WORKSHOP GLIMPSES








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