

Report on Certificate Course: Practical Analytical Instrumentation

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Introduction The Department of Physics at St. Aloysius College, Edathua, offers a specialized certificate course titled *Practical Analytical Instrumentation* for postgraduate students. This course is designed to provide in-depth theoretical and practical knowledge of advanced analytical instruments used in material analysis.

Objective The primary objective of the course is to familiarize students with the working principles, operational techniques, and applications of analytical instruments such as Fourier Transform Infrared Spectroscopy (FTIR) and Ultraviolet-Visible Spectroscopy (UV-Vis). By integrating both theoretical concepts and hands-on training, the course aims to enhance students' understanding of material characterization techniques, enabling them to effectively apply these methods in research and industry.

Course Structure and Duration The course spans a total of 30 hours, comprising both theoretical and practical sessions. The structure is as follows:

- **Theory Sessions (15 hours):**
 - o Introduction to Analytical Instrumentation
 - o Principles and Applications of FTIR
 - o Principles and Applications of UV-Vis Spectroscopy
 - o Data Interpretation and Analysis Techniques
 - o Recent Advancements in Analytical Instrumentation
- **Practical Sessions (15 hours):**
 - o Hands-on Training in FTIR Spectroscopy
 - o Sample Preparation and Analysis using UV-Vis Spectroscopy
 - o Data Collection and Interpretation
 - o Troubleshooting and Maintenance of Instruments

Learning Outcomes Upon successful completion of the course, students will:

- Gain a comprehensive understanding of FTIR and UV-Vis spectroscopy techniques.
- Develop practical skills in operating analytical instruments and interpreting data.
- Enhance their ability to apply spectroscopic methods in material analysis.
- Be better prepared for careers in scientific research, quality control, and industry-related analytical roles.

Conclusion The *Practical Analytical Instrumentation* certificate course provides PG students with an invaluable opportunity to acquire advanced knowledge and practical expertise in material analysis techniques. By bridging the gap between theoretical learning and practical application, the course ensures that students are well-equipped for future academic and professional endeavors.