Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NGLD506	Modern Instrumental Methods in Exploration Geosciences	3	0	0	3

Course Objective
The objective of the course is to present an introduction to Modern instruments their working principal
Learning Outcomes
Upon completion of the course, students will be able to: ➢ Learn the fundamentals and working principal of analytical instruments ➢ Understand sample preparation techniques for different analysis ➢ Limitations of the instrumentation in their field of applications ➢ Use of instruments for specific purposes in exploration

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Analytical Methods in Geochemistry: Classical and rapid methods of analysis, sample digestion techniques, fusion techniques, gravimetry, determination of concentration of major cations by photometry, chromatography	9	This will help the student to understand the basic classical method in geochemistry.
2	Mineral Studies: X-Ray Diffractometry, Secondary Electron Microscopy, Electron Probe Micro Analysis, Cathodoluminescence, Thermoluminescence, Optically Stimulated Luminescence.	9	The topic will elaborate on the nondestructive analysis of geological samples.
3	Optical and X-Ray Spectrometry: Atomic Absorption Spectrometry (AAS), Inductively Coupled Plasma – Atomic (Optical) Emission Spectrometry (ICP-AES/OES), X-Ray Fluorescence Spectrometry, Energy Dispersive and Wavelength Dispersive Techniques	9	This topic will give understanding about trace element analysis.
4	Mass Spectrometry (part 1): Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), Thermal Ionization Mass Spectrometry (TIMS),	7	Students will get fundamental ideas about isotopic analysis.
5	Mass Spectrometry (part 2): Isotope Ratio (Gas Source) Mass Spectrometry (IRMS/GSMS), Secondary Ion Mass Spectrometry (SIMS/SHRIMP), Laser Ablation techniques.	8	Students will get fundamental ideas about the sample preparation, and about isotopic analysis and their applications in the different field of geosciences
	Total Classes	42	

Textbooks:

1. Potts. P.J. (1996) A Handbook of Silicate Rock Analysis, Chapman and Hall, London, 622 pp.
2. Rollinson, H.R. (1993) Using Geochemical Data: Evaluation, Presentation, Interpretation, Pearson Education Limited, Harlow, 352 pp.