Program Content

Recent industrial revolution combined with population explosion is creating tremendous pressure on the groundwater resources and indiscriminate usage may soon lead to irreversible changes to both groundwater quality and quantity. Artificial recharge of aquifers is long believed to be a good remedial measure for groundwater depletion scenarios. However, complex hydrogeology and incomplete understanding of pollution sources often limit potential effectiveness of artificial measures. Isotopes of water molecule and other constituents in water molecule often play crucial role in tracing and tracking pollution sources and pathways along with meaningful understanding of groundwater recharge/dynamics. Therefore, isotopes are very powerful tools in hydrogeological investigation and nowadays have become most essential part of water resource management. A training course on "Application of Isotope Techniques in water Resources Management" covering all water related issues will be an important platform for the participants working in the field of water resources. This training programme is expected to develop a thorough understanding of (i) basic hydrogeology and major hydrological processes (ii) principles of application of isotopes as tools for dating and tracing groundwater flow (iii) application of isotopes to solve practical problems in hydrology and (iv) investigation of the source and fate of groundwater pollution.

Tentative Agenda	
Day 1	Inauguration
	Lecture 1: General concepts of hydrological cycle
	Question/Answer
	Lecture 2: Introductory concepts in groundwater system
	Question/Answer
	Lunch break
	Lecture 3: Introductory concepts of environmental isotopes
	Question/Answer
	Lecture 4: Stable isotopes in precipitation
	Question/Answer
	Lecture 5: Stable isotopes in surface water
	Question/Answer and Closing remarks of Day 1
Day 2	**Lecture 6:** Stable isotopes and groundwater quality
	Question/Answer
	Lecture 7: Stable isotopes in water-rock-gas interaction
	Question/Answer
	Lunch break
	Lecture 8: Surface water - groundwater interaction
	Question/Answer
	Lecture 9: Overview of groundwater dating methods (Principles of groundwater dating and applications)
	Question/Answer
	Lecture 10: Traditional methods of dating young (<1000y) and old groundwater (>1000y)

	Question/Answer and Closing remarks of Day 2
Day 3	**Lecture 11:**Models for interpretation of groundwater age
	Question/Answer
	Lecture 12: Hydrochemistry evolution as proxy for groundwater dating
	Question/Answer
	Lunch break
	Lecture 13: Sampling procedures for tracing and dating
	Question/Answer
	Lecture 14: Stable isotopes analysis
	Question/Answer
	Lecture 15: Radioactive isotopes analysis
	Question/Answer and Closing remarks of Day 3
Day 4	**Lecture 16:** Planning and preparation for sampling, common errors in sampling, safety procedures and post- processing.
	Question/Answer
	Lecture 17: Major sources of groundwater pollution
	Question/Answer
	Lunch Break
	Lecture 18: Geochemical approach of groundwater pollution assessment
	Question/Answer
	Lecture 19: Isotopic approaches of groundwater pollution assessment
	Question/Answer
	Lecture 20: Few case studies
	Question/Answer and course closure remarks, feedback session
	Course ends