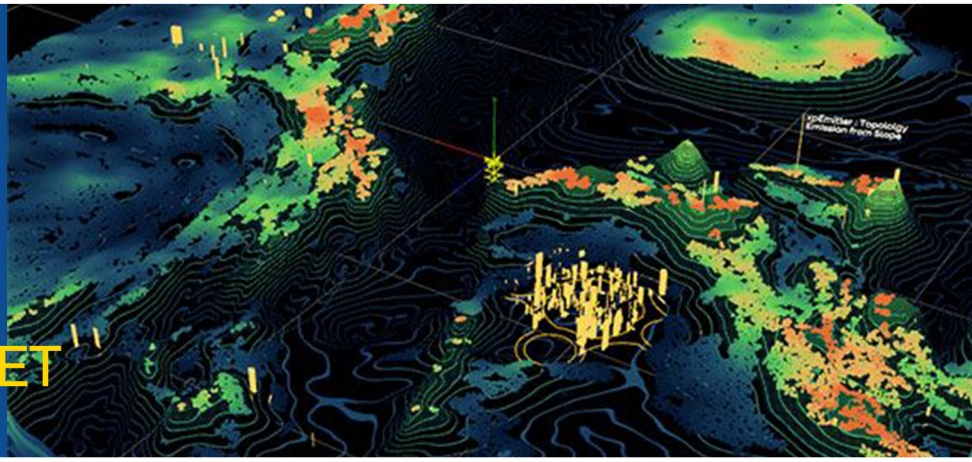
KNUST RWESCK Regional Water & Environmental Sanitation Centre Kumasi | Kwame Nkrumah University of Science and Technology

Ghana Atomic Energy Commission

WRC WATER RESOURCES COMMISSION

SHORT COURSE

INFORMATION SHEET



ISOTOPES IN ENVIRONMENTAL STUDIES:

Basic Principles, Data Analysis and Analytical Methods using Laser Spectrometry

Ghana Atomic Energy Commission

21 – 25 July, 2025

Accra, Ghana

This project is funded by the Commission of the European Union

Stellenbosch University

AUDA - NEPAD African Union Development Agency

European Commission JOINT RESEARCH CENTRE

1. INRODUCTION

Isotope hydrology is a powerful tool for understanding the movement, distribution, and quality of water within natural systems, and it plays a critical role in groundwater management, environmental monitoring, and climate change studies. As part of its commitment to capacity building, the Regional Water and Environmental Sanitation Centre, Kumasi (RWESCK), in collaboration with the Ghana Atomic Energy Commission and the Water Resources Commission, and under the auspices of the AUDA-NEPAD African Network of Centres of Excellence in Water Sciences and Technology (ACEWATER III), is offering a 5-day residential short course on isotope hydrology. This course aims to strengthen expertise in this specialized area of water resources management.

The short course titled Isotopes in environmental studies: basic principles, data analysis and analytical methods using laser spectrometry, incorporates the latest theoretical developments and practical exercises, and is designed to enhance the expertise of professionals, researchers, and students in isotope hydrology, focusing on the methods and techniques for processing and interpreting isotopic data.

2. OBJECTIVES

The course aims to offer a comprehensive overview of isotope hydrology, focusing on its applications in water resource management. It also covers the latest advancements in isotope hydrology to better understand and characterize atmospheric, surface, and groundwater systems. Participants will gain the skills needed to process and interpret isotopic data accurately, addressing critical hydrological questions. The training also includes hands-on exercises and real-world case studies to illustrate the practical applications of isotope techniques in diverse hydrological settings.

3. Target Audience and Prerequisites

The course is open to 30 participants. Participants should have a university degree with a technical/scientific profile that attests to their experience with the use of hydrological, hydrogeological or hydrochemical techniques, and/or their involvement in water resources assessment and/or management.

In the selection process, priority will be given to scientific staff and researchers (PhD and MPhil candidates) involved in hydro(geo)logical research and/or projects related to water resources assessment and management. They should preferably have a good understanding of water-related/hydrogeological issues. All participants should come along with a laptop computer.

4. Working Language

The language of instruction will be English. Successful applicants should have sufficient proficiency to follow lectures and express themselves in this language without difficulty.

5. Structure

The course is designed to run on face-to-face mode from 21-25 July, 2025. The course delivery will include lectures, case study presentations and hands-on exercises focused on key hydrological concepts, commonly addressed using isotope hydrology tools. Participants will be expected to complete pre workshop and post workshop questionnaire and an online assessment at the end of short course. The detailed course structure and schedule is found in appendix 1(page 6).

6. Application and Participation

Interested participants should apply using the google form at https://shorturl.at/16Ssz .Applicants should upload their CV and motivation letter as part of the application process. Applicants whose profile strictly meet those outlined under section 3 will be considered. The deadline for application is 31st May, 2025.

7. Venue

The short course sessions and accommodation for participants will take place at the Ghana Atomic Energy Commission (GAEC), located at Atomic Junction in Kwabenya, within the Greater Accra Region of Ghana. The Commission is positioned along the Haatso–Atomic Road, approximately 13 kilometers northeast of Accra's city center. The digital address of the venue is **GE-257-0465**

8. Important Dates

All applicants are to take note of the following important dates

Dates	Event
April 30, 2025	Call for Applications
May 31, 2025	Call closes
June 5, 2025	Review and Selection of Applicants
June 10, 2025	Communication to Successful Applicants

NOTE:

Please note that only selected candidates will be further contacted by June 10th, 2025.

9. Additional Information

An official certificate of completion will be awarded to course participants. For any further details regarding the shortcourse, contact the RWESCK ACEWATER III secretariat via acewater.gh@gmail.com or +233(0)243212413

10. Scientific Committee

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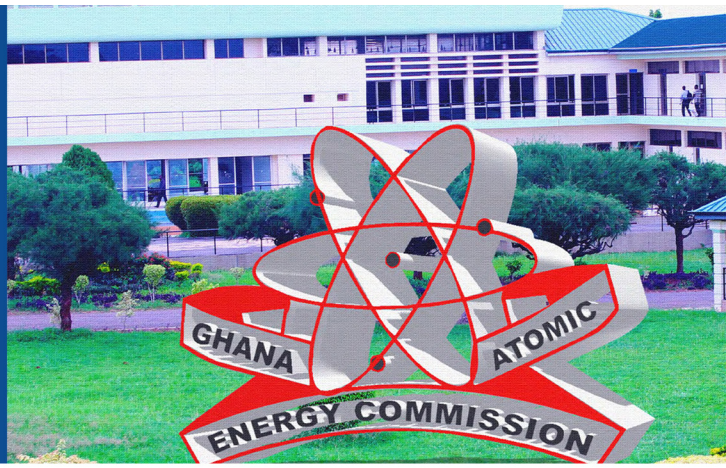
Appendix 1

SHORT COURSE

PROGRAMME SCHEDULE



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Time	Monday, 21/07/2025	Venue	Facilitator
9:00-9:45 AM	Opening ceremony	SNAS Conference room	Prof. Geophrey Anornu/ Director General, GAEC
9:45-10:00 AM	Group Photograph		
10:00-10:30 AM	Health Break		
10:30-12:30 PM	Introduction to hydrology and hydrogeology	SNAS Conference room	Prof Geophrey Anornu/ Prof. Martin Eduvie
12:30-2:00 PM	Lunch Break		
2:00 – 3:30 PM	**Hydrochemistry** • Basic concept • Common units for analysis • Quality Assurance and Control of hydro chemical data	SNAS Conference room	Prof. Abass Gibrilla
3:30 – 4:30 PM	Hydrochemical modelling (Diagrammes)	SNAS Conference room	Mr. David Saka

Time	Tuesday, 22/07/2025	Venue	Facilitator
9:00-11:00 PM	**Introduction to stable isotopes** • History and development • Isotopes in the environment and hydrological cycle • Isotopes as tracers of various hydrological processes	SNAS Conference room	Prof. Samuel Ganyaglo
11:00 -11:15 AM	Health Break		
11:15-12:30 PM	**Applications of stable isotopes in** • Hydrology • animal ecology and migration • forensics • paleo-environmental reconstructions, etc.)	SNAS Conference room	Dr. Courage Egbi

Time	Tuesday, 22/07/2025	Venue	Facilitator
12:30-2:00 PM	Lunch Break		
2:00-3:00 PM	**Sample collection and preservation** • Selecting the sampling sites • Sampling of precipitation (rain and snow) • Sampling of groundwater and surface water	SNAS Conference room	Dr. Cynthia Nonterah
3:00-4:30 PM	**Introduction to the analysis of stable isotopes: laser spectrometry** • Viewing Los Gatos instrument • Software interfaces and options, LIMS • Maintenance, Autosampler, Calibration • Preparation and Storage of Measurement and Lab Standards • Laboratory Working Standard Calibration Templates to VSMOW/SLAP scales	SNAS Conference room	Dr. Cynthia Nonterah

Time	Wednesday,23/07/2025	Venue	Facilitator
9:00-11:00 AM	**Stable isotopes of the water molecule: data processing and hydrological applications** • Basic interpretations (volume weighted values, d-excess, global and local meteoric water lines, evaporation line) • Hydrograph separation binary mixing analysis	SNAS Conference room	Prof. Abass Gibrilla
11:00 -11:15 AM	Health Break	NNRI Conference room	
11:15 – 12:30 PM	**Tritium analysis and data processing** • Tritium as a hydrological tracer • Sampling and analysis in hydrological components • Data processing for hydrological applications	SNAS Conference room	Prof. Samuel Ganyaglo

Time	Wednesday,23/07/2025	Venue	Facilitator
12:30-2:00 PM	Lunch Break		
2:00-4:30 PM	Visit to GAEC laboratories		All

Time	Thursday, 24/07/2025	Venue	Facilitator
9:00-10:00 AM	**Nitrate stable isotopes analysis and data processing** • Stable isotopes of nitrate as hydrological tracers • Sampling and analysis in hydrological components • Data processing for hydrological and pollution sources tracking	SNAS Conference room	Dr. Courage Egbi
10:00-11:00 AM	R Packages (MixSIAR, SMMR)	SNAS Conference room	Mr. David Saka
10:00-11:15 AM	Health Break		
11:15-12:30 PM	R Packages (MixSIAR, SMMR)	SNAS Conference room	Mr. David Saka
12:300-2:00 PM	Lunch Break		
2:00-3:00 PM	**Carbon-14 analysis and data processing** • Carbon-14 as a hydrological tracer • Sampling and analysis in hydrological components • Data processing for hydrological applications	SNAS Conference room	Prof. Samuel Ganyaglo
3:00-4:30 PM	Data analysis/Case studies	SNAS Conference room	All

Time	Friday, 25/07/2025	Venue	Facilitator
9:00-10:00 AM	Data analysis/Case studies	SNAS Conference room	All
10:00-10:15 AM	Health Break		
10:15 -12:00 PM	Data analysis/Case studies	SNAS Conference room	All
12:00-12:30 PM	Closing & presentation of certificates	SNAS Conference room	
12:30 – 1:30 PM	Lunch Break		
1:30 – 4:30 PM	Professional Networking		

Moderators
Dr. Charles Gyamfi
Mrs Vida Apusiga

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