

AQUA Foundation Academy

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Training Workshop on Ground Penetrating Radar (Data Acquisition, Processing, Interpretation & Advanced Processing) September 12-13, 2014, New Delhi, India

Introduction:

Ground Penetrating Radar, also known as GPR, Georadar, Subsurface Interface Radar, Geoprobnging Radar, is a totally non-destructive technique to produce a cross section profile of subsurface without any drilling, trenching or ground disturbances. Ground penetrating radar (GPR) profiles are used for evaluating the location and depth of buried objects and to investigate the presence and continuity of natural subsurface conditions and features.

The method is being used extensively around the world for various applications including, but not limited to:

- Geological and hydro-geological investigations including mapping of bedrock topography, water levels, solution features, glacial structures, soils and aggregates.
- Engineering investigations to evaluate dams, sea walls, tunnels, pavements, roadbeds, railway embankments, piles, bridge decks, river scour, buildings and monuments.
- Location and evaluation of buried structures including utilities, foundations, reinforcing bars, cavities, tombs, archaeological artefacts, and animal burrows.
- Site investigations: location of buried engineering structures and underground storage tanks.
- Subsurface mapping for cables, pipes and other buried structures prior to trench-less operations.
- Defence & Law Enforcement applications like detection of buried tunnels, graves, unexploded ordinance, landmines, crevasses in snow bound areas, etc.

Objectives:

The incorrect and inappropriate use of GPR has over the years caused a great deal of damage to its reputation as a bona fide and reliable technology. The objective of this training workshop on GPR is to make the participants familiar with advanced data processing and interpretation techniques to derive maximum amount of information from data collected. After completing this course, user should be able to collect the GPR data, carry out basic as well as advanced data processing of data and interpret the results in a range of application areas.

Who Should Attend:

This 02 day training program will help professionals, engineers and geo-scientists dealing with shallow sub-surface investigation. The program is designed for new as well as experienced users of GPR equipment. The program will also help project owners hiring services of GPR surveys, enabling them understand capabilities and limitations of the method and derive maximum return on their investment on a GPR survey. The program is useful for individuals, organizations and professionals from following fields:

- Water, electrical, telecom, gas and other utility companies
- Construction/ Infrastructure organizations
- Trenchless companies

- Environment consultants/ contractors
- Army, Police, Para-Military forces, CBI, CID and other law enforcement/ investigation agencies
- Concrete inspection agencies/ consultants/ contractors
- Road inspection authorities, vigilance officials
- Archaeological survey organizations
- Geologists, Hydro-geologists, Geophysicists and Civil Engineers
- Existing GPR users
- Fresh geophysicists/ engineers planning to pursue career in the field of GPR

Benefits:

The program will enable the participant to derive maximum information from GPR data and help them design the right GPR investigation program for a particular project requirement. It will also enable them to choose the right combination of antennas for varied geological conditions and resolution requirements.

Key Elements:

- Introduction to Geophysics
- Introduction to geology, soil properties, stratigraphic processes.
- Introduction to Ground Penetrating Radar Method
 - Brief History
 - Basic Principal
 - EM Waves Propagation
 - Velocity of EM Waves
 - Wavelength/ attenuation/ dispersion
 - Electrical Properties of Rocks, Soils, Fluids
 - Magnetic Properties of Rocks, Soils, Fluids
 - Environmental influences of temperature, pressure, chemistry and time
 - Geological Heterogeneity, Anisotropy and scale
 - Radar Equation
 - Scattering, reflection, refraction and diffraction
 - Antenna Polarization, Fresnel Coefficient, Snell's law
 - Near Field, Far Field, Multi-pathing, interferences
- Field Procedure and Approaches for GPR Surveys
- Antenna selection, frequency v/s depth
- Various Antenna Configurations in various applications
- Data acquisition, data handling
- Data Processing
 - High pass, low pass filters
 - Ormsy bandpass filtering
 - Notch Filters
 - AGC, Move Out Correction, Terrain Correction
 - Migration, energy envelops
 - Time-depth conversion
- Data interpretation
- Field Demonstration of GPR Surveys
- Specific case studies & methodology for:
 - Utility Detection
 - Concrete inspection
 - Archaeology
 - Pavement inspection

- Ground water & geology
- Cavity Detection
- Presentation by Trainees
- Interactive session with trainees

Facilitator:

Dr. Sanjay Rana is a geophysicist working in the field of engineering geophysics for last 24 years. Dr Rana passed out in 1990 from University of Roorkee, now IIT Roorkee, in M Tech (Applied Geophysics), as Gold Medallist. He also holds MBA and Doctorate qualifications.

He is member of various working committees for development of Code of Practices and Standards. He is member of International Group of Geophysicists working on development of GPR technology, including Modelling, Spectrum Analysis and Data Libraries for Signature Modelling. He has conducted 58 training programs on GPR for various organizations in different countries. He has Experience of working with most of the available GPR models like GSSI, Mala, Sensor & Software, Pipe Hawk, Cobra, and Zond. His geographic GPR experience includes India, Canada, Singapore, Saudi Arabia, Oman, Afghanistan and Bahrain. Till date he has conducted more than 500 GPR projects for various applications.

He has used Ground Penetrating Radar for a wide range of applications including utility mapping, archaeology, cavity detection, concrete scanning, pavement analysis, vadose zone study, water resources, landmine detection, contaminant study etc.

Fee Structure:

Rs 10,000 or USD 250 per participant, inclusive of training notes, morning & evening tea & Lunch. A discount of 20% for students and 10% discount on group booking of 04 or more participants from a single organization is applicable.

Registration Process:

Prior registration is must by sending email to info@aquafoundation.in. Fee to be paid through DD in favour of Aqua Foundation payable at Delhi, India. It can also be deposited in following account:

Name of the Bank: ICICI Bank Ltd

Address of the Bank: ICICI Bank, 9 A, Phelps Building, Connaught Place, New Delhi- 110001

Name of the Account holder: AQUA FOUNDATION

A/C no : 000701260885; **IFSC Code:** ICIC0000007; **Swift Code:** ICICI NBB CTS

Contact Details: Secretary General, Aqua Foundation, C-24, 1st Floor, Soami Nagar (North), Panchsheel Enclave, New Delhi 110 017 (India), Mobile: +91-9818568825, info@aquafoundation.in