

Hydrometry - Advanced

Duration: 2 days

Synopsis

This course is intended for hydrologists, water resources and environmental practitioners who are required to undertake hydrological monitoring. The course concentrates on basic hydraulic theory, flow measurement structures, stage-discharge analysis, acoustic flow monitoring technologies and other techniques. The course will be primarily classroom based but practical demonstrations and a field excursion will be included.

Prerequisites

This course builds on the work introduced in the introductory hydrometry courses. Delegates should have taken one of these or have working experience of hydrometric techniques.

Outcomes

After undertaking this course, delegates should have a thorough understanding of several important hydrometric techniques. They should be able to calculate rating equations describing the stage discharge relationship at gauged sections and at flow control structures. They should understand acoustic techniques of flow monitoring and the application of Index Velocity in the determination of discharge. They should know the major methods of water level sensing and their limitations and the process of data retrieval and logging.

Content

The course will teach the characteristics and siting considerations of standard weirs and flumes, their advantages and limitations and methods of determining flow at these structures. The major water level sensing technologies are described, including air-ranging and in-water ultrasonics, submerged pressure transducers and shaft encoders; together with the circumstances under which each may be appropriate. Acoustic velocity area methods of flow determination are taught, including transit time / time-of-flight Ultrasonics, bed mounted Doppler and Horizontal Acoustic Doppler Velocity Profilers (side lookers). The instruments are examined in terms of deployment considerations and the data streams they generate. Processing of acoustic velocity data is considered and Index Velocity techniques are introduced to determine mean velocities and flow at sampled locations. All the techniques are consolidated using appropriate exercises and the course ends with a field excursion, to view some of the structures and instruments on site and to collect short data streams.

The course programme covers

- Characteristics of standard flow control structures
- Techniques for determining discharge at these structures
- Development of the stage discharge relationship at gauged sites
- The principal techniques of water level sensing
- Advantages, limitations and deployment of water level sensing instruments
- The principles of acoustic technologies
- Acoustic instruments, their deployment and data processing
- The use of Index Velocity techniques.

Tuition will use a hands-on approach, with no more than six participants per tutor. The main features of each topic will be explained and discussed with delegates using case studies and examples from different hydrological situations. Knowledge will be consolidated through fieldwork and the use of structured exercises involving simple calculations associated with each technique.