The Centre for Water Research (CWR)

@ The University of Western Australia

Online Software Training Courses

THE UNIVERSITY OF WESTERN AUSTRALIA

Achieve International Excellence

CENTRE FOR WATER RESEARCH

Centre for Water Research (CWR)
The University of Western Australia

Director: Jorg Imberger

About Us

CWR based at The University of Western Australia is an internationally recognised research organisation in the field of water quality management. Over a thirty year period we have made rapid advances in process understanding, sensor and instrumentation technology and modelling of lakes, reservoirs, estuarine systems and the coastal ocean.

These advances in fundamental understanding are now applied in the operation and management of reservoirs used for drinking water, power generation, flood control and in the enhancement of natural water bodies.

Software

CWR offers a range of process-based numerical models for simulation of the physical, chemical and biological dynamics within aquatic systems. Our software is used in over 90 countries worldwide by scientists, utilities, regulatory agencies and environmental consultants. Software developed at CWR undergoes continuous development by our expert staff and through our international network of research partners to ensure that the most recent scientific and computational methods are incorporated.

Hydrodynamic models: A suite of hydrodynamic models developed at CWR can simulate the dynamics of salinity, temperature, currents, and the mixing and transport of heat, sediment, pollutants and biological particles in rivers, lakes, estuaries and the coastal ocean.

Water quality models: CAEDYM, the CWR platform for simulation of aquatic ecology and water quality issues is recognized as one of the most powerful in the industry. It interfaces with all our hydrodynamic models to simulate the fate and transport of multiple biogeochemical variables that include sediments, dissolved oxygen, nutrients, metals, pathogens, algae and other biological species.

Aquatic Real-time Management System (ARMS): is a decision support system to aid managers and operators of surface water bodies (reservoirs, lakes, rivers, estuaries, coastal oceans). Its underlying philosophy is to provide an automated software system that requires minimal maintenance to monitor and forecast the conditions of surface water resources, and to notify relevant staff of current conditions on a regular basis.

CWR models are designed to run on standard desktop computers at speeds of around 200 times real time for domains with the order of one million grid points.

Further information about CWR software can be found on our website at:
http://www.cwr.uwa.edu.au/software1/models1.php?mdid=1

Course Description

CWR offers two online courses of approximately three days each, designed to give students, researchers and industry professionals hands-on experience in using ELCOM and ELCOM-CAEDYM. These models can be used for simulating estuaries, lakes, reservoirs and the coastal ocean, for eutrophication, pollution and climate change studies.

Course Outline

Each course is designed to give you the skills to run your own models. The courses consists of lectures, audio/video, reading materials and quizzes to get you on the road to modelling success. Material can be downloaded for future reference, and the lectures can downloaded in an iPod compatible format.

ELCOM

(i) Introduction to ELCOM – three-dimensional hydrodynamic modelling

- Introduction to three-dimensional hydrodynamic modelling
- Data requirements for an ELCOM simulation
- Installation of ELCOM and support programs
- Environmental fluid dynamics and ELCOM
- Configuring the physical domain – bathymetry
- Configuring the physical domain – boundary conditions
- Running the pre-processor
- Temporal boundary condition inputs – 1 and 2D files
- Simulation modules and the configuration of an ELCOM simulation
- Configuring output – the datablock file
- Running ELCOM and post-processing the data
- Visualisation and exporting data

CAEDYM

(ii) Introduction to CAEDYM – water quality modelling

- Introduction to water quality modelling
- The oxygen cycle in CAEDYM
- The carbon cycle in CAEDYM
- Nitrogen, phosphorus and silica cycles in CAEDYM
- Using CAEDYM to simulate phytoplankton
- Suspended solids and pathogens
- Initialisation, configuration and water quality constants files
- The time series files
- Running CAEDYM with DYRESM or ELCOM
- Calibration and validation of your coupled model

Who should participate:

- Environmental scientists and engineers
- Water quality managers and consultants
- Freshwater and marine specialists
- Academics who wish to use modelling in their teaching programs and students who wish to undertaking modelling in their research projects

Participants of the course(s) should have some familiarity with computer models and applications.
Both courses will suit engineers, environmental scientists and biologists.

Outcomes

At the completion of the course(s) you will have:

- Acquired an understanding of hydrodynamic and water quality modelling of lakes, reservoirs, estuarine systems and coastal seas
- Gained hands-on experience using CWR models
- Applied CWR models to one of your own projects
- Acquired the skills to complete your own modelling projects

Technical Requirements:

- Standard broadband is a requirement for the lecture component of the course
- Adobe Reader 9, freely available from: **http://www.adobe.com/ap/products/reader/**
- Adobe Flash, freely available from: **http://get.adobe.com/flashplayer/**
- Java, freely available from **http://www.java.com/en/**

Courses will commence on October 4th 2010 and will be run on a continuous basis.

How to enrol: please go to: **http://www.cwr.uwa.edu.au/software1/support1.php**

Cost: $495 per participant per course (Australian dollars) + 10% GST for Australian participants.

Trainer

Jason Antenucci, Associate Professor at the Centre for Water Research based at The University of Western Australia. Jason received his PhD in 2001 from The University of Western Australia.

Jason's research activities can be classified into three main areas: transport mechanisms in aquatic systems, modelling of aquatic systems and the dynamics of organisms impacting human health in aquatic systems.

He has published more than 30 papers in international peer-reviewed journals. He has been actively involved in the development and application of CWR software since 1996, and has delivered training in a diverse range of countries including Colombia, Malaysia, Singapore, Israel, Kenya and Mozambique, as well as in online forms since 2003. He has conducted several projects with UNESCO in East Africa and on greenhouse gas emissions from hydropower, as well as conducted many international research projects in the USA, Brazil, Argentina, Singapore, Japan, Canada, and Chile.

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