



UNIVERSITY OF GOTHENBURG

PhD Course on process oriented numerical modelling of lakes, inland seas and oceans

Course Coordinator and Examiner

Anders Omstedt, Institute of Earth Sciences, University of Gothenburg. E-mail: Anders.omstedt@gvc.gu.se

Planning Group

The course is planned and organised by a planning group consisting of Anders Omstedt (GU), Lars Arneborg (GU), Erik Gustafsson (GU), Lena Viktorsson (GU) and Angela Wulff (GU).

Teaching staffs

Anders Omstedt (GU), Lars Arneborg (GU), Angela Wulff (GU), Jörgen Sahlberg (SMHI), Ola Nordblom (SMHI), Anna Rutgersson (UU), Agneta Fransson (GU).

Course Aim

The use of computational fluid dynamics to analyse and predict changes in the environment has increased considerable during the past decades. Numerical models are now standard tools in research and a wide range of

applications. The main aim of the present course is to stimulate the student to solve aquatic problems using a problem oriented numerical approach. By starting from simple models the participants will learn how to build up a more advanced understanding and getting confidence in the numerical modelling. Part I of the course introduces the student into numerical modelling and defining a number of relevant aquatic problems. Part II of the course teaches the student how to solve an aquatic problem by modelling and how to document the exercise.

Prerequisites

Students are expected to have competence and skill in use of MS Windows based PC. Also some basic knowledge about FORTRAN or interest in learning FORTRAN during the course.

Structure of the course

Part I (7.5 ECTS credits) will include the following:

1. Seminars with invited scientists on basic aspects of the aquatic systems including turbulence, air-sea interaction, ice, strait flows and estuarine circulation, climate dynamics, oxygen, nutrients, primary production, ecosystems and carbon dynamics.
2. Lecture on numerical modelling, the PROBE equation solver, Visual Fortran, modelling: Ekman and strait flows, lakes, oceans, ice, turbulence, coupled sub-basins, oxygen, primary production, nutrients and CO₂ dynamics.

3. Exercises on different aspects of the marine system.

Part II (7.5 ECTS credits) will include the following:

1. Individual problem
2. Problem oriented panel meetings
3. Scientific writing

Registration

All participants need to make registration by sending an e-mail to Anders.Omstedt@gvc.gu.se not later than August 26, 2008.

Course material

Compendium, papers, books and numerical codes.

Time table for PhD Course on process oriented numerical modelling of lakes, inland seas and oceans autumn 2008 Part I (7.5 ECTS):

Day	Date	Time	Type	Teacher
Tuesday w. 36	2/9	0915-1100	Introduction	Anders Omstedt
Tuesday	2/9	1215-1400	Exercises	Erik Gustafsson
Wednesday	3/9	0915-1200	Numerics	Ola Nordblom
Thursday	4/9	0915-1100	Lakes	Anders Omstedt
Thursday	4/9	1215-1400	Exercises	Erik Gustafsson
Tuesday w. 37	9/9	0915-1100	Oceans	Anders Omstedt
Tuesday	9/9	1215-1400	Exercises	Erik Gustafsson
Wednesday	10/9	0915-1100	Ice	Anders Omstedt
Wednesday	10/9	1215-1500	Air-Sea interaction	Anna Rutgersson
Thursday	11/9	0915-1100	Mixing processes	Lars Arneborg
Thursday	11/9	1215-1400	Mixing	Lars Arneborg

			processes	
Tuesday w. 38	16/9	0915-1100	Turbulence	Anders Omstedt
Tuesday	16/9	1215-1400	Exercises	Erik Gustafsson
Wednesday	17/9	0915-1200	Inland waters	Jörgen Sahlberg
Thursday	18/9	0915-1100	Coupled basins	Anders Omstedt
Thursday	18/9	1215-1400	Exercises	Erik Gustafsson
Tuesday w. 39	23/9	0915-1100	Oxygen and nutrients	Anders Omstedt
Tuesday	23/9	1215-1400	Exercises	Erik Gustafsson
Wednesday	24/9	0915-1200	Plankton	Angela Wulff
Thursday	25/9	0915-1100	Primary production	Anders Omstedt
Thursday	25/9	1215-1400	Exercises	Erik Gustafsson
Tuesday w. 40	30/9	0915-1100	Ocean carbon	Agneta Fransson
Tuesday	30/9	1215-1400	Ocean carbon	Agneta Fransson
Wednesday	1/10	0915-1100	Modelling carbon	Anders Omstedt
Wednesday	1/10	1215-14	Exercises	Erik Gustafsson
Thursday	2/10	0915-1100	Summary	Anders Omstedt

Time table for PhD Course on process oriented numerical modelling of lakes, inland seas and oceans autumn 2008 Part II (7.5 ECTS):

Day	Date	Time	Type	Teacher
Wednesday w42	15/10	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Wednesday w43	22/10	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Wednesday w44	29/10	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Wednesday w45	5/11	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Wednesday w46	12/11	0915-1100	Presentations	All
Wednesday w46	12/11	1215-1400	Presentations	All