UNIVERSITY OF GOTHENBURG
DEPARTMENT OF EARTH SCIENCES

Advanced course on process oriented numerical modelling of lakes and coastal seas (OC6310)

Date: 2011-03-01

Course Coordinator and Examiner
Anders Omstedt, Department 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), Erik Gustafsson (GU) and Christian Stranne (GU).

Teaching staffs
Anders Omstedt (GU), Erik Gustafsson (GU), Angela Wulff (GU), Ola Nordblom (DHI), Anna Rutgersson (UU), Agneta Fransson (GU), Kari Eilola (SMHI), Christian Stranne (GU).

Course Aim
The main aims of the present course are to provide scientific understanding and well-tested computer codes for aquatic studies of lakes and coastal seas. 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, carbon dynamics, pH and climate.
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 CO_2 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

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3. Scientific writing

Registration
All participants need to make registration by sending an e-mail to Anders.Omstedt@gvc.gu.se not later than March 1, 2011.

Course material
Omstedt (2011): Guide to process based modelling of lakes and coastal seas. Springer-Praxis books in press. Copy version available to buy at the Department of Earth Sciences.

Time table for advanced course on process oriented numerical modelling of lakes and coastal seas spring 2011 Part I (7.5 ECTS):

Day	Date	Time	Type	Teacher
Wednesday	30/3	0915-1100	Introduction	Anders Omstedt
Thursday	31/3	0915-1100	Introduction	Anders Omstedt
Friday	1/4	0915-1100	Exercises	Erik Gustafsson
Monday	4/4	0915-1100	Modelling	Anders Omstedt
Tuesday	5/4	0915-1100	Numerical methods	Ola Nordblom
Wednesday	6/4	0915-1100	Exercises	Erik Gustafsson
Friday	8/4	0915-1100	Lakes	Anders Omstedt
Friday	8/4	1215-1400	Air-sea interaction	Anna Rutgersson
Monday	11/4	0915-1100	Oceans and ice	Anders Omstedt
Wednesday	13/4	0915-1100	Exercises	Erik Gustafsson
Thursday	14/4	0915-1100	Turbulence and tides	Anders Omstedt
Monday	18/4	0915-1100	Biogeochemical oxygen	Anders Omstedt
Tuesday	19/4	0915-1100	Baltic Sea biogeochemistry	Kari Eilola
Wednesday	20/4	0915-1100	Plankton and nutrients dynamics	Anders Omstedt
Wednesday	20/4	1315-1500	Exercises	Erik Gustafsson
Tuesday	26/4	0915-1100	Carbon, pH and climate	Anders Omstedt
Wednesday	27/4	0915-1100	Marine CO2 system	Agneta Fransson
Thursday	28/4	0915-1100	Plankton dynamics	Angela Wulff
Friday	29/4	0915-1100	Exercises	Erik Gustafsson
Monday	2/5	0915-1100	Nets of sub-basins	Anders Omstedt
Tuesday	3/5	0915-1100	Exercise	Erik Gustsafsson
Friday	6/5	0915-1100	Modelling optional aquatic system	Anders Omstedt/ Christian Stranne

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Time table for advanced course on process oriented numerical modelling of lakes and coastal seas spring 2011 Part II (7.5 ECTS):

Day	Date	Time	Type	Teacher
Tuesday	3/5	1315-1500	Panel meeting	Anders Omstedt
Tuesday	10/5	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Tuesday	17/5	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Friday	27/5	0915-1100	Panel meeting	Anders Omstedt/ Erik Gustafsson
Tuesday	31/5	0915-1100	Presentations	All
Tuesday	31/5	1315-1500	Presentations	All

Examination: Exercises and written individual report should be ready before Friday 10/6.