

Schedule of the course Simulation of Oceans, Atmosphere and Climate 2021

version of 12 October 2021

Tuesday, 7 September 2021, (week 36), 13:15-15:00 (BBG 001):

13:15-14:00: **Lecture 0:** Introduction, describing the structure and plan of the course.

14:15-15:00: **Lecture 1:** Canonical equations of geophysical fluid dynamics. Analytical and numerical solutions of simplified equations describing inertial oscillations.

Thursday, 9 September 2021, 9:00-12:00 (BBG 001):

9:00-10:45: **Lecture 2:** Multi-step time-differencing.

Exercises 1: simulation of inertial oscillations (hand in on 16 Sep. 2021)

Numerical approximation of the (linear) advection equation: numerical diffusion & numerical dispersion.

11:00-12:00: **Tutorial**

Monday 13 September 2021 (week 37), 13:15-15:00 (MIN 016):

13:15-15:00: **Lecture 3:** Numerical stability (CFL-condition). Lax-Wendroff scheme and spectral method.

Exercises 2: simulation of the linear advection of a passive scalar (hand in on 7 Oct. 2021)

Tuesday, 14 September 2021, 13:15-15:00 (BBG 001):

13:15-15:00: **Lecture 4:** Non-linear advection equation. Pseudo-spectral method. Pole problem. Solution of the linear shallow water equations. Numerical accuracy of simulation of gravity wave propagation. Staggered grid, Aliasing.

Very short introduction to the SOAC-projects (Michiel Baatsen).

Exercises 3: simulation of propagating gravity waves (hand in on 7 Oct. 2021)

Thursday, 16 September 2021, 9:00-10:45 (BBG 219):

9:00-9:45: **Lecture by an expert.** Erik van Sebille (IMAU): *Keeping track of model code: Model Version Control*

10:00-10:45: **Tutorial**

Tuesday, 21 September 2021, 15:15-17:00 (BBG 001):

13:15-15:00: **Full introduction to the SOAC-projects** (Michiel Baatsen)

Monday, 8 November 2021 (week 45), 13:15-17:00 (Room ???).

Oral presentations of project (hand in written report at the end of week 45)

Week 5 of 2022:

There will an additional session of project presentations at the end of period 2 for those who cannot finish in one period.

In weeks 40-44: Invited talks by experts in the field

Leo van Kampenhout (IMAU): *Climate Models* – **Monday 4 October 2021, 13:15-14:15 (MIN 016)**

Sander Tijm (KNMI): *Numerical weather forecasting* – **Monday 11 October 2021, 13:15-14:15 (MIN 0.16)**

Michael Kliphuis (IMAU): *Computer hardware* – **Tuesday 19 October 2021, 15:15-16:15 (BBG 169)**