

Level: PhD				
Course title: Analytical Solutions and Numerical Methods of Modeling				
Status: elective				
ECTS: 30				
Requirements: master studies				
Learning objectives Introducing students to the equations of atmospheric hydrodynamics and wave motions in homogeneous and stratified atmosphere. Obtaining the insight into various approximations of the state of atmosphere as well as atmospheric instability.				
Learning outcomes After completing the course the student should develop: General abilities: following the literature, analysis of various solutions and the choice of the most adequate one. Subject-specific abilities: understanding of the processes characterizing the dynamics of the atmosphere, use of mathematical and numerical methods for their modelling, which qualifies students for work in the research institutions related to meteorology and environmental studies.				
Syllabus <i>Theoretical instruction</i> Mathematical introduction. Equations of atmospheric hydrodynamics. Wave motions in the atmosphere. Barotropic and baroclinic instability. Energy changes in the atmosphere. Scale (dimensional) analysis. Methods and problems of the numerical solving of the equations of motion. Finite difference method (Eulerian approach). Models of the numerical weather forecasting. <i>Practical instruction</i> Solving numerical problems.				
Weekly teaching load				Other:
Lectures: 5	Exercises:	Other forms of teaching:	Student research: 15	