

**....Critical Synthesis of Contemporary Scientific Achievements: Introduction to Geophysics....**  
**- COURSE SYLLABUS**



1.	<b>Course title:</b> <i>Critical Synthesis of Contemporary Scientific Achievements: Introduction to Geophysics</i>
2.	<b>Lecturer:</b> <i>Prof. dr hab. Marek Lewandowski Dr hab. Piotr Środa, prof. PAN Dr Dariusz Baranowski Dr Artur Szkop Dr hab. prof. PAN Grzegorz Lizurek Prof. dr hab. Beata Orlecka-Sikora Dr hab. prof. PAN Łukasz Rudziński Prof. dr hab. Mariusz Majdański Cordinated by Dr hab. prof. PAN Łukasz Rudziński</i>
3.	<b>Field, type and level of studies, year of study:</b> <i>Environmental and Earth Sciences, PhD Studies, all years</i>
4.	<b>Course character:</b> <i>Monographic lecture within the International Environmental Doctoral School</i>
5.	<b>Teaching method:</b> <i>traditional</i>
6.	<b>Language:</b> <i>English</i>
7.	<b>Course type and number of hours:</b> <i>Lectures: 7h, Seminars: 5h, Workshops: 2h, Total: 16h</i>
8.	<b>Estimated load of student's independent work:</b> <i>25h</i>
9.	<b>Total workload and number of ECTS points:</b> <i>41h, 2 ECTS</i>
10.	<b>Short description and main focus of the course:</b> <i>The course provides a comprehensive introduction to geophysics, covering the history of the geosystem, Earth's crust and lithosphere, seismology, and atmospheric physics. Key topics include the structure and seismic research of the lithosphere, climate physics, anthropogenic seismicity, and applications of seismology in environmental research. The course combines lectures, seminars, and hands-on workshops.</i>  <i>Agenda (16 hours of lectures, seminars, and workshops)</i>  <i>1 April 2025 (Tuesday)</i>

12:00 - 13:30 Prof. dr hab. Marek Lewandowski (Lecture 2h)  
"A bumpy road from the Big Bang to the geosystem" (Part I)

13:30 – 14:15 Break

14:15 – 15:00 Prof. dr hab. Marek Lewandowski (Seminar 1h)  
"A bumpy road from the Big Bang to the geosystem" (Part II)

15:00 – 15:15 Break

15:15 - 16:45 Dr hab. Piotr Środa, prof. PAN (Lecture 2h)  
"Earth's Crust and Lithosphere - Structure and Seismic Research Methods"

2 April 2025 (Wednesday)

9:00 - 10:30 Dr Dariusz Baranowski & Dr Artur Szkop (Lecture 2h)  
"Introduction to Atmospheric and Climate Physics"

10:30 – 10:45 Break

10:45 - 12:15 Dr Dariusz Baranowski & Dr Artur Szkop (Seminar 2h)  
"Introduction to Atmospheric and Climate Physics"

3 April 2025 (Thursday)

9:30 - 11:00 Dr hab. prof. PAN Grzegorz Lizurek (Lecture 2h)  
"Introduction to Seismology"

11:00 – 11:15 Break

11:15 - 12:45 Prof. dr hab. Beata Orlecka-Sikora (Seminar 2h)  
"Anthropogenic Seismicity"

12:45 – 13:45 Break

13:45 - 15:15 Dr hab. prof. PAN Łukasz Rudziński (Workshop 2h)  
"Data Processing in Seismology"

15:15 – 15:30 Break

15:30 - 16:15 Prof. dr hab. Mariusz Majdański (Lecture 1h)  
"Application of Seismology in environmental Research"

**11. References:**

Aki K., Richards P., *Quantitative Seismology*, Lamont-Doherty Earth Observatory of Columbia University

Lowrie W., 2007, *Fundamentals of Geophysics*, Cambridge University Press

Kump L.R., Kasting J.F., Robert G.C., 2010, *The Earth System*, Pearson Education Inc.

Artemieva, I.M., 2011. *The lithosphere: An interdisciplinary approach*. Cambridge University Press 794 pp.

Fowler, C.M.R. *The solid Earth*. Cambridge University Press, 1993

Bormann, P. (Ed.), 2012. *New Manual of Seismological Observatory Practice (NMSOP-2)*, IASPEI, GFZ German Research Centre for Geosciences, Potsdam; <http://nmsop.gfz-potsdam.de>; DOI: 10.2312/GFZ.NMSOP-2

	<p>Gibowicz S.J., Kijko A. 1994 <i>An Introduction to Mining Seismology</i>, Academic Press, San Diego</p> <p>Shearer P. 2009 <i>Introduction to Seismology</i>, Cambridge University Press, ISBN: 9780521708425</p> <p>Stein, S. &amp; Wysession, M. 2003. <i>An Introduction to Seismology, Earthquakes, and Earth Structure</i>, Oxford: Blackwell Science. ISBN:0865420785</p> <p>Holton, James R. "An introduction to dynamic meteorology." <i>American Journal of Physics</i> 41.5 (1973): 752-754</p> <p>Salby, Murry L. <i>Physics of the Atmosphere and Climate</i>. Cambridge University Press, 2012</p> <p>Williams, Paul. <i>Stochastic physics and climate modelling</i>. Eds. Tim Palmer, and Paul Williams. Vol. 480. Cambridge: Cambridge University Press, 2010.</p> <p>Hanwell, James D. <i>Atmospheric processes</i>. Routledge, 2019</p>	
12.	<p><b>Prerequisites:</b></p> <p><i>Basic knowledge of Earth sciences and physics.</i></p>	
13.	<p><b>Educational outcomes:</b></p> <p><b>Knowledge:</b> <i>understanding of geophysical principles, in the field of seismology and climate physics, introduction to the state-of-the-art methods that are being developed</i></p> <p><b>Practical Skills:</b> <i>ability to analyse seismic and climate-related data, apply research methods in geophysics</i></p> <p><b>Social Skills:</b> <i>ability to work in interdisciplinary research teams, critical analysis of scientific literature, recognize the value of knowledge in solving practical problems</i></p>	<p><b><u>PQF level 8 codes:</u></b></p> <p>P8S_WG</p> <p>P8S_UW</p> <p>P8S_KK</p>
14.	<p><b>Evaluation of the educational outcomes:</b></p> <p><i>Active participation in discussions during lecture seminar and workshops; Final assessment in the form of a written report or examination</i></p>	
15.	<p><b>Criteria to complete the course:</b></p> <p><i>at least 80% attendance, successful completion of assignments and final assessment</i></p>	
16.	<p><b>Contact with the lecturer:</b></p> <p><i>Cordinated by Dr hab. prof. PAN Łukasz Rudziński (rudzin@igf.edu.pl )</i></p>	