

Subject name	Contemporary climate change – the causes, effects, adaptation	
Subject code	IS-CLC-2	
Department	Ecology, Climatology and Air Protection	
Faculty	Environmental Engineering and Land Surveying	
Subject supervisor/Lecturer	Agnieszka Ziernicka-Wojtaszek, P.hD.	
General information	Teaching period	winter or summer semester
	ECTS credit	6
	Lectures total	15
	Lab practical's	30
Objective and general description	Presentation of causes, effects and manifestations of contemporary climate change as well as tasks, which help to protect the environment.	
Lectures 15 x 1 hour	<ol style="list-style-type: none"> 1. The development of the notions and definitions of climate. 2. Climate change and climate variability. 3. The past and present-day climate change. 4. Natural and human induced climate change. 5. Thermal manifestations of present-day climate change. 6. The changes of other meteorological elements, indicators and meteorological phenomena. 7. Climate extremes. 8. Projections of future climate change, IPCC reports, climate forecasts and climate change extrapolation, the modeling of climate. 9. The ecological effects of present-day climate change, the changes in hydrological processes, the cryosphere, sea level rise. 10. Climate change and its impact on water resources and water management. 11. The impact of climate change on agriculture. 12. The impact of climate change on settlement in coastal areas. 13. The social consequences of climate change. 14. The prevention of, and adaptation to climate change. 15. Climate policies. 	
Lab practicals 3 x 1 hour 10 x 2 hours 1 x 3 hours 1 x 4 hours	<ol style="list-style-type: none"> 1. The Macro - processes and the processes taking place in the atmosphere, atmospheric processes and phenomena, the weather, meteorological elements, the relations and interdependencies among meteorological elements, the climate, climatic factors, the dependence of the values of elements of climate on climatic factors, climate indicators and basic statistical characteristics of the climate. 2. The homogeneity of observation stretches as a condition for the detection of climate change. 3. A selection of published materials and meteorological studies on the special diversity of the climate of: Poland, the Carpathian Mountains, the area near Cracow, or Cracow itself. A critical evaluation in the light of the climate change taking place. 	

	<ol style="list-style-type: none"> 4. Statistical measurements of the variability of selected meteorological elements. The classification of temperature and precipitation deviations from the norm, in the light of the climate change taking place. 5. The changes of air temperature observed in Poland and some of their consequences. 6. The mezoclimatic diversity of mountain areas in the light of global warming. 7. Climate change vs precipitation, and water resources in Poland. 8. The change, variability and agricultural effectiveness of precipitation in the light of global warming. 9. The possibilities of cultivating stenothermal plants, the possibilities of cultivating stenothermal plants. 10. The chances and sources of threats to recreation areas in the country in the light of both: the climate change taking place and the one expected. 11. The biometeorological conditions and global warming. 12. The urban heat island, vs global warming. 13. The modeling of thermal and pluviothermal regionalizations of the area of Poland in the light of the climate change taking place. 14. The prevention of climate change. 15. Adaptation to climate change, and its impact on sectors and areas susceptible to climate change.
Literature	<ol style="list-style-type: none"> 1. Bonan G.: Ecological Climatology. Concepts and Applications. Cambridge University Press, 2016, 692. 2. Cowie J.: Climate Change. Biological and Human Aspects. Cambridge University Press, 2007, 504. 3. Dessler A.E.: Introduction to Modern Climate Change. Cambridge University Press, 2012, 238. 4. Fifth Assessment Report – Climate Change 2013 – IPCC. 5. Houghton J.T.: Global warming. Cambridge University Press, 2004, 457. 6. Neelin J., D.: Climate Change and Climate Modeling. Cambridge University Press, 2011, 304. 7. Newell P., Paterson M.: Climate Capitalism. Cambridge University Press, 2010, 205. 8. Ziernicka-Wojtaszek A., Zawora P., Sarna T, Zawora T.: Estimated changes of pluvio-thermal coefficient in Poland in the light of climatic changes. Environmental Engineering III, Taylor & Francis, 2010, 557-560, ISBN 978-0-415-54882-3. 9. Ziernicka-Wojtaszek A., Zawora T.: Thermal regions in light of contemporary climate change in Poland. Polish Journal of Environmental Studies, 20, 6 (2011), 1627-1632. 10. Ziernicka-Wojtaszek A., Zawora T.: Pluviothermal conditions in Poland in light of contemporary climate change and their consequences for agriculture and water management. Polish Journal of Environmental Studies, 24, 1 (2015), 419-425.