Module Handbook of Applied Climatology and Meteorology

Module designation	Applied climatology and meteorology course is a compulsory subject in the Geography Masters Study Program. Applied Climatology and Meteorology courses are mandatory courses for Masters of Geography Masters students who take a specialization in Physical Geography. This course provides students with an understanding of weather and climate parameters that affect many sectors of life, including analysis of urban areas, the agricultural sector, the use of remote sensing technology and disasters and climate change. As with other courses, the approach in this course uses an ecological, spatial and regional complex approach.		
Semester(s) in which the module is taught	Odds/ First (1st) Semester		
Person responsible for the module	Dr. Emilya Nurjani, M.Si. Dr. Mohammad Pramono Hadi, M.Sc. Dr. Andung Bayu Sekaranom, M.Sc.		
Language	Bahasa Indonesia		
Relation to curriculum	Compulsory		
Teaching methods	SCL (Student Centered Learning) : Case-based learning, team-based project.		
Workload (incl. contact hours, self-study hours)	**CLO 1**	Interactive lectures and discussions	4 meetings 8 x 50 minutes of classroom lectures and discussions
	CLO 2	Interactive lectures, individual assignments, and group assignments	3 meetings 6 x 50 minutes of classroom lectures and discussions 3 x 60 minutes of self-paced tasks
	CLO 3	Interactive lectures, discussions, and group assignments	2 meetings 4 x 50 minutes of classroom lectures and discussions 3 x 60 minutes of self-paced tasks
	CLO 4	Interactive lectures, discussions, and group assignments	2 meetings 4 x 50 minutes of classroom lectures and discussions 3 x 60 minutes of self-paced tasks
	CLO 5	Interactive lectures, discussions, and group assignments	3 meetings 6 x 50 minutes of classroom lectures and discussions 1 x 60 minutes of self-paced tasks

Credit points	**Assessment Techniques**	**Percentage of Assessment (%)**	**Criteria/ Indicators**	***CLO (%)***				
				1	***2***	**3**	**4**	**5**
	Participatory Activities*)	25%	Contribution of class discussion activities in each subject matter of the lecture			**5%**	**5%**	**5%**
	Project Results/ Case Study Results/ PBL Results*)	45%	Complete case study reports are available		**15%**	**15%**	**10%**	**5%**
	Cognitive							
	Assignment	10%	The results of the task are available and complete				**10%**	
	Mid-term	15%	Students answer the questions correctly	**15%**				
	Final Exam	15%	Students answer the questions correctly		**15%**			
	Total	100%		**15%**	**30%**	**20%**	**25%**	**10%**
	*) can be obtained from Mid-term or Final exams which are the results of participatory activities or the results of projects/case studies. By IKU 7, the total percentage of participatory activities and project results/case studies/PBL at least 70%.							
Required and recommended prerequisites for joining the module	Taken after taking compulsory courses							
Module objectives/intended learning outcomes	**PLO A1**	Understand the material and formal objects of geography in order to solve problems resulting from the imbalance of interaction between geographical components.						
	PLO B1	Mastering the application of geography to manage the environment and human						

		resources in rural, urban, watershed, coastal and marine areas through spatial, ecological and regional complex approaches.
	CLO 1	Students are able to know and understand climate concepts, global, regional and local climate classifications and climograph analysis; understand the concept of rain in relation to weather and climate as well as data sources, measurement, data quality testing, spatial and time analysis of rain; understand data sources and measurement of meteorological and climatological data, how to calibrate tools and validate data (PLO A1)
	CLO 2	How changes in land/urban use can change the weather and climate and what are the strategies to mitigate them; understand various climate phenomena in the agricultural sector and how to analyze them (PLO B1)
	CLO 3	Understand remote sensing technology that can be used for weather and climate analysis and can use it on a basic basis (PLO B1)
	CLO 4	Students are able to understand the concept of modeling in both simple and complex climates and are able to apply it; understand the concept of weather prediction and climate projection (scale and utilization) (PLO A1)
	CLO 5	Students are able to understand the concept of hydrometeorological disasters (causes, processes and impacts) and efforts to overcome them (mitigation and adaptation); understand the concept of climate change (global warming, greenhouse effect, hydrometeorological disasters) and provide solutions for mitigation and adaptation (PLO A1)
Content	**CLO 1**	Climate concepts, global, regional and local climate classifications and climograph analysis; understand the concept of rain in relation to weather and climate as well as data sources, measurement, data quality testing, spatial and time analysis of rain; understand data sources and measurements of meteorological and climatological data, how to calibrate tools and validate data.
	CLO 2	Land/urban use can change the weather and climate and what are the strategies to mitigate it; understand various climate phenomena in the agricultural sector and how to analyze them
	CLO 3	Understand remote sensing technology that can be used for weather and climate analysis and be able to use it on a basic basis
	CLO 4	Understand the concept of modeling in both simple and complex climates and be able to apply it; understand the concept of weather prediction and climate projection (scale and utilization
	CLO 5	Understand the concept of hydrometeorological disasters (causes, processes and impacts) and efforts to overcome them (mitigation and adaptation); understand the concept of climate change (global warming, greenhouse effect, hydrometeorological disasters) and provide solutions for mitigation and adaptation
Examination forms	Mid-term and Final Exam	

Study and Examination Requirements	Student participation 25%, Project result 45%, Assignment 10%, Summative Test (Mid-term and Final Exam) 30%
Reading list	**Main:** 1. Landsberg, Helmut, 1981. The Urban Climate. Imprint : Academic Press\ 2. STMKG, 2017. Peringaratan Hari Meteorologi Dunia ke 67 Understanding Climate and Weather for Sustainability : Prosiding Seminar Meteorologi dan Klimatologi 3. Harpal S. Mavi., and Graeme J., Tupper, 2004. Agrometeology : Principles and Application on Climate Studies in Agriculture. New York : Food Product Press 4. Byant, E., 2005. Natural Hazard. Port Melbourne : Cambridge University Press 5. Khakhim, N., Jatmiko, R.H., Nurjani, E., 2014. Perubahan Iklim dan Pemanfaatan Sig di Kawasan Pesisir. Yogyakarta : Gadjah Mada University Press. 6. Ahrens, C. D. (2012). *Meteorology today: an introduction to weather, climate, and the environment*. Cengage Learning. 7. Ahrens, C. D. (2011). *Essentials of meteorology: an invitation to the atmosphere.* Cengage Learning. 8. Randall, D. (2012). *Atmosphere, clouds, and climate*. Princeton University Press. 9. Rakhecha, P., & Singh, V. P. (2009). *Applied hydrometeorology.* Springer Science & Business Media. 10. Kelkar, R. R. (2007). *Satellite meteorology.* BS Publications. 11. Brönimann, S., Luterbacher, J., Ewen, T., Diaz, H. F., Stolarski, R. S., & Neu, U. (2008). *Climate variability and extremes during the past 100 years*. 12. World meteorological organization (Geneva). (1996). *Guide to meteorological instruments and methods of observation*. Secretariat of the World Meteorological Organization.
	Additional: