Module Name	Tropical Climate
Module level, if applicable	
Code, if applicable	GEL 2207
Semester(s) in which the module	Fourth (4^{th}) Semester
Person responsible for the module	Prof. Dr. H.A. Sudibyakto, M.S Dr. Emilya Nurjani, S.Si., M.Si
Lecturer	Prof. Dr. H.A. Sudibyakto, M.S Dr. Emilya Nurjani, S.Si., M.Si Utia Suarma, S.Si., M.Si
Language	Bahasa Indonesia
Relation to curriculum	For Geography and Enviromental Science students only. This course is an advanced course that serves as a support for several other courses in the faculty, including Hydrometeorology and Meteorology and Climatology. This course discusses the tropical climate concept; tropical climate phenomenon (global, regional, local); climate prediction model; climate and environmental variability, global warming and climate change, and climate disaster.
Type of teaching	STAR *(Student Teacher Aesthetic Role-Sharing)* is an optimal combination between SCL *(Student Centered Learning)* and TCL *(Teacher Centered Learning)*. Lecture: 1400 minutes
Workload	Lecturer, including homework and discussion = 14 meetings x 100 minutes each Mid Semester Examination: 100 minutes Final Semester Examination: 100 minutes Total workload = 1600 minutes
Credit points	2
Requirements according to the examination regulations	Must attend lecture for more than 70%
Recommended prerequisites	-
Module objectives/intended learning aoutcomes	1. After following the lecture topic **Understanding the Tropical Climate**, students are able to: a. Explain the definition of tropical climate. b. Explain the characteristics of tropical climates. c. Explain the atmospheric dynamics in tropical climates. 2. After following the lecture topic **Global Circulation**, students are able to: a. Explain the general characteristics of the atmosphere in the tropics. b. Explain the circulation of Hadley cells and Walker's circulation. c. Describe monsoon wind, foehn wind, and local wind (land wind and sea breeze) d. Explain the interaction of the ocean-atmosphere and El-Nino's symptoms.

	3. After following the lecture topic **The Tropical Climate and Its Impact on Water Resources and Atmospheric Phenomena**, students are able to: a. Explain some of the weather and climate element parameters in tropical climates. b. Explain the characteristics of water resources in tropical climates. c. Explain the atmospheric phenomena that occur in tropical climates. 4. After following the lecture topic **Monsoon, QBO, SOI, MJO, DMI, ST**, students are able to: a. Explain the theoretical concept of the monsoon circulation and through case studies. b. Explain the concept of QBO (Quasi-biennial oscillation). c. Explain the concept of SOI (Southern Ossilation Index). d. Explain the concept of MJO (Madden-Julian Ossilation). e. Explain the concept of DMI (Dipole-Mode Index) theoretically and through case studies. f. Explain the concept of ST (Tropical Cyclone). 5. After following the lecture topic **ITCZ and ITCZ Impact in Indonesia**, students are able to: a. Explain the concept of ITCZ (Inter-Tropical Convergence Zone). b. Explain the impact of ITCZ in Indonesia. 6. After following the lecture topic **Weather Forecasting**, students are able to: a. Explain the concept of weather forecasting and seasons. b. Explain weather forecasting methods (field measurement, statistical data analysis, and weather satellites such as TRMM and Himawari). 7. After following the lecture topic **Climate Modeling**, students are able to: a. Explain the concept of climate systems and climate modeling. b. Explain the types of climate modeling. c. Explain validation, prediction, projections, and climate scenarios. 8. After following the lecture topic **Urban Climate**, students are able to: a. Explain the concept of the urban climate. b. Explain changes in urban climate parameters (temperature, wind, rain, humidity). c. Explain the urban heat island effect. 9. After following the lecture topic **Global warming**, students are able to: a. Explain the phenomenon (cause and effect) of global warming.

	b. Explain the impacts of climate change on ecological and social conditions. 10. After following the lecture topic **Field Course**, students are able to: a. Apply tropical climate theory to case studies in the field. 11. After following the lecture topic **Climate Change: Mitigation**, students are able to: a. Explain the definition of mitigation. b. Explain the types of mitigation to climate change. c. Provide examples of climate change mitigation activities in Indonesia. d. Making simple design / design mitigation of climate change. 12. After following the lecture topic **Climate Change: Adaptation**, students are able to: a. Explain the definition of adaptation. b. Explain the types of adaptation to climate change. c. Provide examples of climate change adaptation activities in Indonesia.
Content	1. Understanding the Tropical Climate. 2. Global Circulation. 3. The Tropical Climate and Its Impact on Water Resources and Atmospheric Phenomena. 4. Monsoon, QBO, SOI, MJO, DMI, ST. 5. ITCZ and ITCZ Impact in Indonesia. 6. Weather Forecasting. 7. Climate Modeling. 8. Urban Climate. 9. Global warming. 10. Field Course. 11. Climate Change: Mitigation. 12. Climate Change: Adaptation.
Study and examination requirements and forms of examination	Quiz (5 %), participation (5 %), assignment (20 %), discussion (10 %), mid-semester examination (30 %) dan final examination (30 %). Examination is formed in written test.
Media employed	- ELISA website - Internet - Computers - Interactive video - LCD projector
Reading list	Ahrens, C. D. 2007. *Essential of Meteorology: An Introduction to The Atmosphere.* USA: Cengage Learning. Ahrens, C. D. 2009. *Meteorology Today (9theds)*. USA: Cengage Learning. Prawirowardoyo, Susilo. 1996. *Meteorologi.* Bandung: Penerbit ITB. Tjasyono, Bayong. 2004. *Klimatologi*. Bandung: Penerbit ITB.

	Seyhan, Ersin. 1990. *Dasar-Dasar Hidrologi* (diterjemahkan oleh Sentot Subagyo). Yogyakarta: Gadjah Mada University Press. Strahler, A. N. 1969. *Physical Geography (3rd eds)*. New York. John Wiley and Sons. Brimblecombe, P., and Maynard, RL., 2001. The Urban Atmosphere and Its Effects : Air Pollution Reviews Vol 1. London : Imperial College Press. Burroughs, WJ., 2007. Climate Change : A Multidisciplinary Approach the second edition. New York : Cambridge. Caviedes, CN., 2001. ElNino in History : Storming Through the Ages. Gainesville : University Press of Florida. Clift, PD., and Plumb, RA., 2008. The Asian Monsoon : Causes, History and Effects. New York : Cambridge. Landsberg, HE., 1981. *The Urban Climate*. New York : Academic Press.