			Document Code
	Universitas Negeri Surabaya **Faculty of Social and Legal Sciences** **Geography Education Undergraduate Study Program**		

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
METEOROLOGY - CLIMATOLOGY	8720202102	Physical Geography	T=2	P=0	ECTS=3.18	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	Case Studies

Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-5	Able to make appropriate decisions to solve educational problems and transformative geography learning by utilizing various learning resources based on science and technology and the arts
	PLO-7	Able to make appropriate decisions to resolve regional problems in a spatial context based on an integrated geographic approach
	Program Objectives (PO)	
	PO - 1	Able to analyze weather and climate elements in a region and create regional rainfall maps, analyze meteorological data to determine climate change and its impact on human life.
	PLO-PO Matrix	

P.O	PLO-5	PLO-7
PO-1		

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																

Short Course Description	Able to understand the concept and scope of Meteorology and Climatology, the composition and layers of the atmosphere, and be able to carry out measurements and analysis of weather data which includes insolation and air temperature, air pressure and wind, air humidity and precipitation, air mass and weather dynamics that occur through observation individually or in groups, as well as being able to determine the exact climate of a region according to the climate classification by Schmidt-Fergusson, Koppen, Thornthwaite, Miller and Mohr through analysis of climate data obtained in the field.

References	**Main :**

1. 1. Bayong Tjasyono HK, 2004, Klimatologi, Bandung, Penerbit ITB
2. 2. Laode Sabaruddin,2014, AGROKLIMATOLOGI Aspek-aspek Klimatik untuk Sistem Budidaya Tanaman, Bandung, penerbit Alfa Beta
3. 3. Tumiar Katarina Manik, 2014, Klimatologi Dasar Unsur Iklim dan Proses Pembentukan Iklim, Yogyakarta, Graha Ilmu
4. 4. Ance Gunarsih Kartasapoetra, 2016, KLIMATOLOGI Pengaruh Iklim Terhadap Tanah dan Tanaman, Jakarta, Bumi Aksara
5. 5. Daldjoeni, N., 2014, Pokok-pokok Klimatologi, Yogyakarta, Penerbit Ombak
6. 6. Bayu Dwi Apri Nugroho, 2016, Fenomena Iklim Global, Perubahan Iklim, dan Dampaknya di Indonesia, Yogyakarta, gadjah mada University Press.

Supporters:

1. 1. Soewarno, 2015, HIROLOGI Pengukuran dan Pengolahan Data Curah Hujan, Contoh Aplikasi Hidrologi dalam Pengelolaan Sumber Daya Air, Yogyakarta, Graha Ilmu

Supporting lecturer	Drs. Agus Sutedjo, M.Si. Drs. Bambang Hariyanto, M.Pd.

Week-	Final abilities of each learning	Evaluation		Help Learning, Learning methods, Student Assignments, **[Estimated time]**	Learning materials	Assessment Weight (%)

(1)	stage (Sub-PO) (2)	Indicator (3)	Criteria & Form (4)	Offline (offline) (5)	Online (online) (6)	[References] (7)	(8)
1	Able to analyze the scope of meteorology and climatology in relation to benefits for life	1. Explain the meaning of Meteorology and Climatology 2. Explain climate and weather control 3. Explain the composition of the atmospheric layers	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities, Tests	Questions and Answers and lectures 2 X 50		**Material:** 1. Understanding Meteorology and Climatology 2. Control of climate and weather 3. Composition of atmospheric layers **References:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	4%
2	Able to analyze the scope of meteorology and climatology in relation to benefits for life	1. Explain the properties of the atmosphere 2. Explain the structure of the atmospheric layers 3. Explain the purpose and benefits of weather/climate	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities, Tests	lecture, question and answer 2 X 50		**Material:** 1. Atmospheric properties 2. Atmospheric layer structure 3. Purpose and benefits of weather/climate **References:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	4%
3	Able to analyze solar radiation and air temperature in the atmosphere	1. Explain the meaning of solar radiation 2. Explain the factors that influence solar radiation 2. Explain the relationship between solar radiation and air temperature	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities	questions and answers and lectures 2 X 50		**Material:** 1. Understanding solar radiation 2. Factors that influence solar radiation 3. Relationship between solar radiation and air temperature **References:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	4%
4	Able to analyze solar radiation and air temperature in the atmosphere	1. Explain the meaning of air temperature in the atmosphere. 2. Explain the transfer of heat in the atmosphere. 3. Explain the distribution of air temperature. 4. Explain measuring and calculating regional air temperature.	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities	questions and answers and lectures 2 X 50		**Material:** 1. Understanding air temperature in the atmosphere. 2. Transfer/transfer of heat in the atmosphere. 3. Air temperature distribution. 4. Measurement and calculating regional air temperature. **References:** *3. Tumiar Katarina Manik, 2014, Basic Climatology of Climate Elements and Climate Formation Processes, Yogyakarta, Graha Ilmu*	4%

5	Able to analyze air humidity in an area	1. Explain the meaning of air humidity 2. Explain relative air humidity 3. Explain absolute air humidity 4. Explain specific air humidity 5. Measurement and Calculation of Air Humidity	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities	questions and answers and lectures 2 X 50		**Material:** humidity **References:** *3. Tumiar Katarina Manik, 2014, Basic Climatology of Climate Elements and Climate Formation Processes, Yogyakarta, Graha Ilmu*	8%
6	Able to analyze cloud types and rain data to determine average regional rainfall.	1. Explain the meaning of clouds. 2. Explain the Classification of Clouds 3. Explain the meaning of rain	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities, Tests	lecture, question and answer and assignment 2 X 50		**Material:** 1. Understanding clouds. 2. Cloud Classification 3. Understanding rain **References:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	8%
7	Able to analyze cloud types and rain data to determine average regional rainfall.	1. Explain the relationship between clouds and rain 2. Explain the classification of rain 3. Calculate regional rainfall using the Arithmetic, Thiessen Polygon and Isohyet methods	**Criteria:** Assessments are carried out at UTS **Form of Assessment** : Participatory Activities, Tests	lecture, question and answer and assignment 2 X 50		**Material:** 1. The relationship between clouds and rain 2. Rain classification 3. Calculating regional rainfall using the Arithmetic method, Thiessen Polygons, and Isohyet **References:** *1. Soewarno, 2015, HYROLOGY Measurement and Processing of Rainfall Data, Examples of Hydrology Applications in Resource Management Water Power, Yogyakarta, Graha Ilmu*	18%
8	Analyzing meteorology climatology	Accuracy of meteorological climatological analysis	**Criteria:** The UTS questions consist of 4 questions with different weights/assessment scores for each question. Question no. 1 is given a weighting of 0 - 20, question no. 2 is given a weight of 0 - 30, question no. 3 is given a weight of 0 - 25, and question no. 4 is given a weight of 0 - 25, the total score is between 0 - 100. The material tested comes from the material meetings 1 to 7. **Form of Assessment** : Test	Written Test (Mid-Semester Exam) 3 X 50		**Material:** basic meteorology **Bibliography:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	5%
9	Able to analyze air pressure and wind data in an area	1. Explain the meaning of air pressure 2. Explain the distribution of air pressure 3. Explain the meaning of wind	**Criteria:** Assessment is carried out at UAS **Form of Assessment** : Participatory Activities	lecture and question and answer 2 X 50		**Material:** 1. Understanding air pressure 2. Distribution of air pressure 3. Understanding wind **Reference:** *5. Daldjoeni, N., 2014, Principles of Climatology, Yogyakarta, Ombak Publishers*	8%

10	1.Students are able to explain astronomical climate and physical climate 2.Able to analyze air pressure and wind data in an area	Accuracy of analysis	**Criteria:** Assessment is carried out at UAS **Form of Assessment** : Participatory Activities	lecture and question and answer 2 X 50		**Material:** 1. Factors that influence wind speed and direction 2. Types of wind 3. Explain the relationship between air temperature, air pressure and wind. **Bibliography:** *1. Bayong Tjasyono HK, 2004, Climatology, Bandung, ITB Publisher*	7%
11	Able to analyze the climate in Indonesia for various needs of human life	Explain climate classification	**Criteria:** Assessment is carried out at UAS	Lectures and questions and answers 2 X 50		**Material:** Explaining climate classification **Reference:** *5. Daldjoeni, N., 2014, Principles of Climatology, Yogyakarta, Ombak Publishers*	6%
12	Able to analyze the climate in Indonesia for various needs of human life	Explains climate determination based on meteorological data in a region	**Criteria:** Assessment is carried out at UAS **Form of Assessment** : Participatory Activities, Tests	lecture and question and answer 2 X 50		**Material:** Explain the relationship between climate and human life. **References:** *4. Ance Gunarsih Kartasapoetra, 2016, CLIMATOLOGY The Effect of Climate on Soil and Plants, Jakarta, Bumi Aksara*	8%
13	Able to analyze the climate in Indonesia for various needs of human life	Explains climate determination based on meteorological data in a region	**Criteria:** Assessment is carried out at UAS **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Tests	lecture, question and answer assignment 2 X 50		**Material:** Explaining climate determination based on meteorological data in an area **Reference:** *3. Tumiar Katarina Manik, 2014, Basic Climatology of Climate Elements and Climate Formation Processes, Yogyakarta, Graha Ilmu*	8%
14	Able to analyze meteorological data to determine whether there is global climate change and its impact on human life	1. Explain the meaning of climate change 2. Explain the theory of climate change 3 . Explain the formation and depletion of the ozonosphere	**Criteria:** Assessment is carried out at UAS **Form of Assessment** : Participatory Activities, Tests	lecture and question and answer 2 X 50		**Material:** 1. Understanding climate change 2. Climate change theory 3. Formation and depletion of the ozonosphere **References:** *6. Bayu Dwi Apri Nugroho, 2016, Global Climate Phenomenon, Climate Change, and its Impact in Indonesia, Yogyakarta, Gadjah Mada University Press.*	4%

| 15 | Able to analyze meteorological data to determine whether there is global climate change and its impact on human life | 1. Explain the role of greenhouse gases and aerosols on climate 2. Explain the indications of climate change 3. Explain the impacts of climate change | **Criteria:** Assessment is carried out at UAS

Form of Assessment : Participatory Activities | lecture and question and answer 2 X 50 | | **Material:** 1. The role of greenhouse gases and aerosols on climate 2. Explaining indications of climate change 3. Explaining the impact of climate change **References:** *6. Bayu Dwi Apri Nugroho, 2016, Global Climate Phenomenon, Climate Change, and its Impact in Indonesia, Yogyakarta, Gadjah Mada University Press.* | 4% |
| 16 | Analyzing climatology | accuracy of climatological analysis | **Criteria:** The UAS questions consist of 4 questions with different weights/assessment scores for each question. Question no. 1 is given a weighting of 0 - 20, question no. 2 is given a weight of 0 - 30, question no. 3 is given a weight of 0 - 25, and question no. 4 is given a weight of 0 - 25, the total score is between 0 - 100. The material tested comes from the material meeting 9 to 15

Form of Assessment : Test | test 2 x 50 | | **Material:** climatology **Bibliography:** *3. Tumiar Katarina Manik, 2014, Basic Climatology of Climate Elements and Climate Formation Processes, Yogyakarta, Graha Ilmu* | 5% |

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	60.67%
2.	Project Results Assessment / Product Assessment	2.67%
3.	Test	35.67%
		99.01%

Notes
1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.