



**BRAWIJAYA UNIVERSITY FACULTY OF ENGINEERING
PS S1 URBAN AND REGIONAL PLANNING**

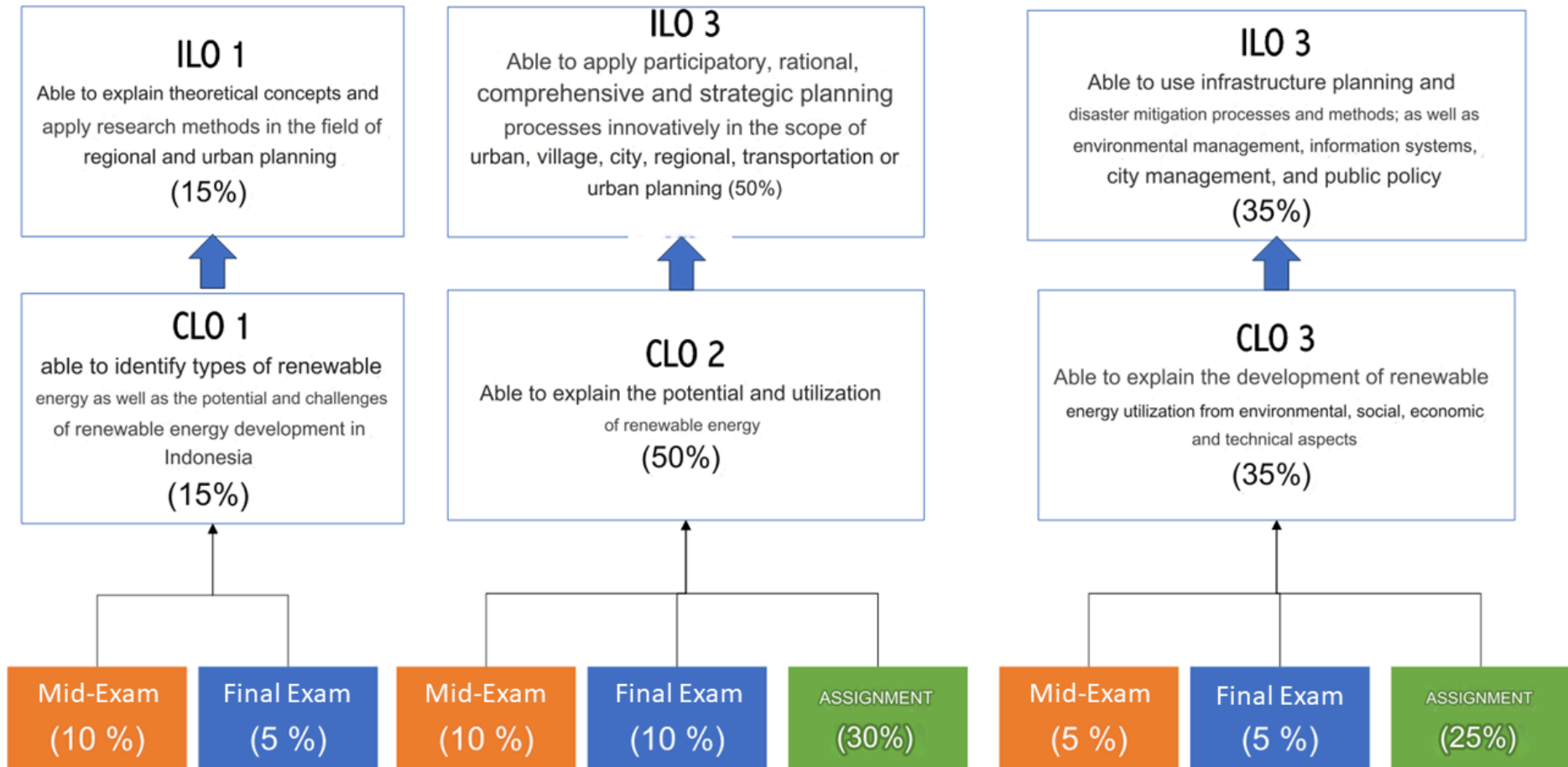
SEMESTER LEARNING PLAN

SUBJECT	CODE	COURSE SCOPE	WEIGHT (credits)	SEMESTER	Date of Preparation
Renewable Energy Management	TKW 6201 8	Urban Settlements	3	6	August 2023
AUTHORIZATION Urban Settlement Compartment	RPS(SEMESTER LEARNING PLAN) DEVELOPER LECTURER		SUBJECT COORDINATOR.		Head of Undergraduate Study Program (S1)
	1. Christia Meidiana				
LEARNING OUTCOMES	SLO/ILO (Intended Learning Outcome)				
	1	Able to explain theoretical concepts and apply research methods in the field of urban and regional planning;			
	3	Able to apply participatory, comprehensive rational, and strategic planning processes innovatively in the context of urban settlements, villages, cities, regions, transportation, or urban design;			
	4	Able to use processes and methods in infrastructure planning and disaster mitigation, as well as environmental management, information systems, urban management, and public policy;			
	11	Able to demonstrate responsibility for work in their field of expertise, either independently or within a team, and develop organizational and entrepreneurial skills in accordance with laws, values, norms, and ethics.			
	CPMK/CLO (Class Learning Outcome)				
	1	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia.			
	2	Able to calculate the potential and utilization of renewable energy			
	3	Able to review the development of renewable energy utilization from environmental, social, economic and technical aspects.			
	SUB CPMK/CLO				
	1	Explain the general definition of renewable energy and recent developments in the world	Support CPMK/CLO to....		
	2	Explain the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	Support CPMK/CLO to....		
	3	Explain the definition of RDF as renewable energy and the impact of utilization from 3 aspects	Support CPMK/CLO to....		
	4	Able to calculate the potential of biogas as renewable energy.	Support CPMK/CLO to....		
	5	Explain the social & economic, technical aspects of Solar power as RE	Support CPMK/CLO to....		
	6	Calculating the technical aspects of wind power as ET	Support CPMK/CLO to....		
	7	Describe case studies of solar and wind power utilization as RE.	Support CPMK/CLO to....		

	8	Explain the social & economic, technical aspects of biomass (algae) as RE	Support CPMK/CLO to....				
	9	Explain the case study of biomass utilization (algae) as RE	Support CPMK/CLO to....				
	10	Explain the social & economic, technical aspects of tidal power as RE	Support CPMK/CLO to....				
	11	Explain the social & economic, technical aspects of organic waste power as RE	Support CPMK/CLO to....				
	12	Describe case studies of technical utilization of tidal power as RE	Support CPMK/CLO to....				
	13	Explain the social & economic, technical aspects of hydropower as RE	Support CPMK/CLO to....				
	14	Describe case studies of technical utilization of geothermal or water power as RE	Support CPMK/CLO to....				
BRIEF DESCRIPTION OF THE COURSE	This course provides students with insights into renewable energy that can be used as an alternative solution to the problem of fossil-based energy crisis with all its impacts.						
OVERVIEW	<p>MAIN</p> <ol style="list-style-type: none"> Kalbande, S dkk. 2011. Bioenergy assessment and its integration for self sufficient renewable energy village. KARNATAKA J. AGRIC. SCI. XXIV (2): 207-210 Saharia. 2003. Pemberdayaan Masyarakat Di Pedesaan Sebagai Salah Satu Upaya Pemanfaatan Potensi Sumberdaya Manusia Secara Optimal. Makalah Individu Pengantar Falsafah Sains (PPS702). Sekolah Pascasarjana / S3 Institut Pertanian Bogor. E-mail: sahauntad@yahoo.com. Di akses, 5 April 2013 Simanjuntak, Melvin Emil. 2005. Beberapa Energi Alternatif yang Terbarukan dan Proses Pembuatannya. JURNAL TEKNIK SIMETRIKA. IV (1): 287-293 Thu, Cu Thi Thien, et all. 2012. Manure Management Practices on Biogas and Non-Biogas Pig Farms in Developing Countries-Using Livestock Farms in Vietnam as an Example. JURNAL OF CLEANER PRODUCTION. 27: 64-71 U.S. Environmental Protection Agency, the U.S. Department of Agriculture, and the U.S. Department of Energy. 2004. AgSTAR Handbook. Ulaan, Tertius V. Y. (2008). Jurnal FORMAS. Prospek Pemanfaatan Sumber energi Terbarukan Biofuels di Sulawesi Utara , 267-276Dai, A., 2013. Increasing drought under global warming in observations and models (online). III: 52–58 <p>SUPPORT</p> <ol style="list-style-type: none"> Trofimenko, N. 2011. Climate Change: Current Issues. Kiel Institute for the World Economy. UNFCCC. 2007 Climate Change: Impacts, Vulnerabilities and Adaptations in Developing Countries. UNFCCC 						
LEARNING MEDIA	<p>SOFTWARE</p> <p>Microsoft Power Point, Keynote, Microsoft Excel, Arc GIS, Gapura UB (SIADO and SIAM)</p> <p>HARDWARE.</p> <p>Laptop, LCD projector, laser pointer</p>						
TEAM TEACHING	<ol style="list-style-type: none"> Christia Meidiana (CM) Ismu Rini Dwi Ari, MT, Ph.D. (IRDA) Dr. Septiana Hariyani ST., MT. (SH) Kartika Eka Sari, ST., MT (KES) 						
COURSE REQUIREMENTS	-						
Description ILO PS S1 PWK (Undergraduate Study Program URP)	<table border="1"> <tr> <td>1</td> <td>Able to explain theoretical concepts and apply research methods in the field of urban and regional planning;</td> </tr> <tr> <td>2</td> <td>Able to carry out surveys in the field of regional and urban planning, both individually and in groups effectively and efficiently.</td> </tr> </table>			1	Able to explain theoretical concepts and apply research methods in the field of urban and regional planning;	2	Able to carry out surveys in the field of regional and urban planning, both individually and in groups effectively and efficiently.
1	Able to explain theoretical concepts and apply research methods in the field of urban and regional planning;						
2	Able to carry out surveys in the field of regional and urban planning, both individually and in groups effectively and efficiently.						

	3	Able to apply participatory, comprehensive rational and strategic planning processes innovatively in the scope of urban settlement planning, villages, cities, regions, transportation or urban design.
	4	Able to use the processes and methods of infrastructure planning and disaster mitigation; as well as environmental management, information systems, urban management, and public policy.
	5	Able to analyze and evaluate problems in the field of PWK with a comprehensive, advocative, and innovative rational planning approach.
	6	Able to operate software applications that support research, planning and design in the field of PWK.
	7	Able to apply theories and methods in the field of PWK for the integration of planning and development of resilient villages and cities.
	8	Able to formulate concepts and prepare spatial physical planning by considering socio-cultural, economic, institutional, and environmental aspects.
	9	Able to present concepts and methods communicatively and provide assistance or facilitation in planning activities.
	10	Able to compile scientific work and its publication in the form of research or planning results.
	11	Apply a responsible attitude to work in their field of expertise independently or in a team and develop organizational and entrepreneurial skills, in accordance with laws, values, norms, and ethics.

Diagram of Relationship/percentage of ILO OBE/KKNI with CLOs



Assessment weight mapping - CPMK/CLO

	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia.	Able to calculate the potential and utilization of renewable energy	Able to review the development of renewable energy utilization from environmental, social, economic and technical aspects.	Total
CB1	0	0,5	0,5	1
Mid-Exam1	0,4	0,4	0,2	1
CB2	0	0,5	0,5	1
Final Exam1	0,3	0,4	0,3	1

FINAL SCORE WEIGHT (INPUT SIADO LECTURER)

The following fields are for the calculation of student final grades inputted by lecturers to SIADO (OBE menu)

Recapitulation of Percentage of Relationship between CPMK / CLO and Assessment

CPMK/CL O	DESCRIPTION	CB1	Mid-Exam1	CB2	Final Exam1	Weight (%)
1	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia.	0	10	0	5	15
2	Able to calculate the potential and utilization of renewable energy	15	10	15	10	50
3	Able to review the development of renewable energy utilization from environmental, social, economic and technical aspects.	12,5	5	12,5	5	35
	Final Score =	27,5	25	27,5	20	100

**Assessment Case Based Learning*

ILO and CLO relationship and assessment

ILO and IK ILO charged in the Site Planning course				CLO			Media assessment and its contribution to MK competency score (%)			Week
ILO	ILO Statement	IK-ILO	IK- ILO Statement	CLO Statement	CLO Weight	Assessment Media	Tasks	Mid-Exam	Final Exam	
1	Able to explain theoretical concepts and apply research methods in the field of regional and urban planning	1B	Apply research and methods in the field of urban and regional planning	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia.	15	Mid Exam		10		8
						Final Exam			5	16
3	Able to apply participatory, comprehensive rational and strategic planning processes innovatively in the scope of urban settlement planning, villages, cities, regions, transportation or urban design.	3B	Innovatively apply participatory planning processes and methods to Urban and Rural Settlement Planning.	Able to explain the potential and utilization of renewable energy	50	Tasks	30			On schedule
						Mid Exam		10		8
						Final Exam			10	16
4	Able to use the processes and methods of infrastructure planning and disaster mitigation; as well as environmental management, information systems, city management, and public policy.	4B	Using Environmental Management processes and methods	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects	35	Tasks	25			On schedule
						Mid Exam		5		8
						Final Exam			5	16

Recapitulation of Percentage Relationship between CLO and Assessment

CLO		Tasks	Mid-Exam	Final Exam
1	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia.	0	10	5
2	Able to explain the potential and utilization of renewable energy	30*	10	10
3	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects	25*	5	5
		55	25	20

***Assessment Case Based Learning**

Percentage Recapitulation of ILO and CLO Relationship

	ILO 1	ILO 3	ILO 4	Weight (%)
CLO 1	15			15
CLO 2		50*		50
CLO 3			35*+	35
Weight (%)	15	50	35	100

*30% of CBL Assignments

**25% of CBL Assignments

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
(1)	(2)	(3)	(4)	(5)	(8)	(6)		(7)	(9)
1	CM	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia [CLO 1].	Explain the general definition of renewable energy and recent developments in the world	Accuracy in explaining the definition and latest developments in RE utilization	Criteria: Clarity of description according to the explanation of lecture material and other related sources. Assessment: Test: MID-EXAM essay questions Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Tasks: - • 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%
2	CM	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects [CLO 3]	Explain the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	<ul style="list-style-type: none"> • Accuracy in explaining the limitations of biomass as ET • Accuracy in explaining the types and utilization of biomass for alternative energy 	Criteria: Clarity of discussion and description according to the explanation of lecture material and other related sources. Assessment: Test: Non Test: CBL Assignment	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 1: Literature study related to social & economic, technical aspects • 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
3	CM	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects [CLO 3]	Explain the definition of RDF as renewable energy and the impact of utilization from 3 aspects	<ul style="list-style-type: none"> • Accuracy in explaining the definition of RDF • Accuracy in explaining the types and utilization of RDF for alternative energy. 	<p>Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation.</p> <p>Assessment:</p> <p>Test:</p> <p>Non Test: CBL Tasks</p>	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 1: Literature study related to social & economic, technical aspects • 	<p>Lecture: 2x 50 minutes</p> <p>Discussion: 50 minutes</p> <p>Assignments and self-study: 60 minutes + 60 Minutes</p>		10%
4	CM	Able to explain the potential and utilization of renewable energy [CLO 2]	Able to explain the potential of biogas as renewable energy	<ul style="list-style-type: none"> • Accuracy in explaining the sources of biogas and its utilization in Indonesia • Accuracy in using the biogas potential calculation method 	<p>Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation.</p> <p>Assessment:</p> <p>Test:</p> <p>Non Test: CBL Assignment</p>	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 2: Calculating biogas potential based on case studies 	<p>Lecture: 2x 50 minutes</p> <p>Discussion: 50 minutes</p> <p>Assignments and self-study: 60 minutes + 60 Minutes</p>		10%
5	SH	Able to explain the development of renewable energy utilization from environmental, social,	Explain the social & economic, technical aspects of	<ul style="list-style-type: none"> • Accuracy in explaining 3 aspects in the utilization of solar 	<p>Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation.</p>	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 1: 	<p>Lecture: 2x 50 minutes</p> <p>Discussion: 50 minutes</p>		5%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
		economic and technical aspects [CLO 3]	Solar power as RE	power and water as RE <ul style="list-style-type: none"> • Accuracy in explaining the calculation method of solar power potential 	Assessment: Test: MID-EXAM Essay Question Non Test:	Literature study related to social & economic, technical aspects <ul style="list-style-type: none"> • 	Assignments and self-study: 60 minutes + 60 Minutes		
6	SH	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia [CLO 1].	Explain the technical aspects of wind power as RE	<ul style="list-style-type: none"> • Accuracy in explaining 3 aspects in the utilization of hydropower as RE • Accuracy in using hydropower potential calculation methods 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: MID-EXAM Essay Question Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 2: Calculating wind power potential based on case studies • 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%
7	SH	Able to explain the potential and utilization of renewable energy [CLO 2]	Describe case studies of solar and wind power utilization as RE	<ul style="list-style-type: none"> • Appropriateness of case study selection (currentness and completeness of data) 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: MID-EXAM Essay Question	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 3: Case Studies Case 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		10%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
				<ul style="list-style-type: none"> Accuracy in concluding case studies of solar and water power utilization in Indonesia and foreign countries. 	Non Test:	studies of solar or wind power utilization as RE			
8	MID-E XAM	Evaluation 1							
9	KES	Able to explain the potential and utilization of renewable energy [CLO 2]	Explain the social & economic, technical aspects of biomass (algae) as RE	<ul style="list-style-type: none"> Accuracy in explaining 3 aspects of biomass utilization as RE Accuracy in explaining the method of calculating biomass potential 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: Non Test: CBL Tasks	<ul style="list-style-type: none"> Lecture. Lecture Discussion Task 1: Literature study related to social & economic, technical aspects 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%
10	KES	Able to explain the potential and utilization of renewable energy [CLO 2]	Explain the social & economic, technical aspects of tidal power as RE	<ul style="list-style-type: none"> Appropriateness of case study selection (currentness and completeness of data) 	Criteria: Completeness and clear sources according to the discussion and description of the lecture explanation. Assessment: Test:	<ul style="list-style-type: none"> Lecture. Lecture Discussion Task 3: Group assignment Case study 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study:		10%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
				<ul style="list-style-type: none"> • Accuracy in concluding case studies of biomass utilization in Indonesia and foreign countries. 	Non Test: CBL Tasks	of biomass utilization (algae) as RE <ul style="list-style-type: none"> • 	60 minutes + 60 Minutes		
11	KES	Able to explain the potential and utilization of renewable energy [CLO 2]	Explain the social & economic, technical aspects of organic waste power as RE	<ul style="list-style-type: none"> • Accuracy in explaining 3 aspects in the utilization of organic waste energy as RE • Accuracy in explaining the method of calculating biomass potential 	Criteria: Completeness and clear sources according to the discussion and description of the lecture explanation. Assessment: Test: Non Test: CBL Tasks	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 1: • Literature study related to social & economic aspects, technical tidal power as RE 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%
12	KES	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects [CLO 3]	Describe case studies of technical utilization of tidal power as RE	<ul style="list-style-type: none"> • Appropriateness of case study selection (currentness and completeness of data) • Accuracy in concluding case 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 3: • Group assignment Case study of 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		10%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
				studies of tidal power utilization in Indonesia and foreign countries.	CBL Tasks	technical utilization of tidal power as RE			
13	IRDA	Able to identify types of renewable energy and the potential and challenges of renewable energy development in Indonesia [CLO 1].	Explain the social & economic, technical aspects of geothermal as RE	<ul style="list-style-type: none"> • Accuracy in explaining 3 aspects in the utilization of tidal power as RE • Accuracy in explaining the method of calculating geothermal energy potential. 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: FINAL EXAM Essay Question Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%
14	IRDA	Able to explain the potential and utilization of renewable energy [CLO 2]	Explain the social & economic, technical aspects of hydropower as RE	<ul style="list-style-type: none"> • Accuracy in explaining 3 aspects in the utilization of hydropower (hydro) as RE • Accuracy in explaining the method of calculating the 	Criteria: Accuracy in the use of analytical methods and clear sources, in accordance with the description of the lecture explanation. Assessment: Test: FINAL EXAM Essay Question Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 1: Literature study related to social & economic aspects, technical hydropower as RE 	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		5%

Week	Lecturer	Expected End Capability (CLO)	Subject matter	Indicator	Criteria & form of Assessment (Indicator)	Learning Methods	Time (duration)	Learning Material / Study Material [Literature]	Value Weight
				potential of water (hydro) energy		•			
15	IRDA	Able to explain the development of renewable energy utilization from environmental, social, economic and technical aspects [CLO 3]	Describe case studies of technical utilization of geothermal or water power as RE	<ul style="list-style-type: none"> • Appropriateness of case study selection (currentness and completeness of data) • Accuracy in concluding case studies of geothermal or water power utilization 	Criteria: Completeness of case study discussion Assessment: Test: FINAL EXAM Essay Question Non Test:	<ul style="list-style-type: none"> • Lecture. Lecture • Discussion • Task 3: - Group assignment Case study on the utilization of geothermal or water power as RE	Lecture: 2x 50 minutes Discussion: 50 minutes Assignments and self-study: 60 minutes + 60 Minutes		10%
16	FINAL EXAM	Evaluation 2							



**BRAWIJAYA UNIVERSITY
FACULTY OF ENGINEERING
PWK DEPARTMENT / S1 PWK STUDY PROGRAM**

TASK PLAN 1

SUBJECT	RENEWABLE ENERGY MANAGEMENT				
CODE	TKW 4108	credits	3	SEMESTER	6
INSTRUCTOR	Christia Meidiana				
TASK FORM	TASK TIME				
Individual/Independent	50 minutes/week/semester				
CASED BASED LEARNING ASSIGNMENT TITLE					
Review of case studies of renewable energy utilization (Biomass and Biogas)					
TASK THEME					
Evaluate the potential utilization of renewable energy sources					
COURSE LEARNING TOPICS					
Explain the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects Explain the definition of RDF as renewable energy and the impact of utilization from 3 aspects Able to explain the potential of biogas as renewable energy.					
TASK DESCRIPTION					
Students Case study of renewable energy utilization (Biomass and Biogas)					
ASSIGNMENT METHOD					
Individual: Case Study Literature review					
FORM AND FORMAT OF OUTPUT					
a. Object of Study: Case study b. Form of Output: Review report c. Output Format: 1. Substance review: <ul style="list-style-type: none">• Explanation of the definition of biomass, RDF and biogas					

- Potential utilization of renewable energy sources from 3 aspects
2. Report format
 - Word/pdf format
 - Adding supporting references to the review from recent journals

INDICATORS, CRITERIA AND ASSESSMENT WEIGHT

1. Explanation of biomass definition from 3 aspects
2. Explanation of RDF definition from 3 aspects
3. Explanation of the potential of biogas as a **renewable** energy

IMPLEMENTATION SCHEDULE

Literature identification	Week 2 - 3
Review case study report	Week 4
Report Collection	Week 8

Assessment Rubric (CBL TASK 1)

Task Type : Review case study of renewable energy utilization (Biomass and Biogas)

Assessment type : Analytic/descriptive rubric and CBL perception rubric

Assessment indicators : ILO 3 and ILO 4

1. Innovatively apply participatory planning processes and methods to Urban and Rural Settlement Planning.
2. Using Environmental Management processes and methods

Assessment criteria

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	Explain the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	20	Unable to explain the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	Able to explain 30% definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	Able to explain 60% of the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects	Able to explain 90% of the definition of biomass (waste) as renewable energy and the impact of utilization from 3 aspects
definition of RDF as renewable energy and impact of utilization from 3 aspects	Explain the definition of RDF as renewable energy and the impact of utilization from 3 aspects	20	Unable to explain the definition of RDF as renewable energy and the impact of utilization from 3 aspects	Able to explain 30% definition of RDF as renewable energy and the impact of utilization from 3 aspects	Able to explain 60% of the definition of RDF as renewable energy and the impact of utilization from 3 aspects	Able to explain 90% of the definition of RDF as renewable energy and the impact of utilization from 3 aspects

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
potential of biogas as renewable energy	Explain the potential of biogas as renewable energy	20	Unable to explain the potential of biogas as renewable energy	Able to explain 30% of biogas potential as renewable energy	Able to explain 60% of biogas potential as renewable energy	Able to explain 90% of biogas potential as renewable energy
Report	Clarity of writing and novelty of supporting literature	40	Does not meet the overall requirements	Meets 30% of requirements	Meets 60% of requirements	Meets 90% of requirements



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TASK PLAN 2

SUBJECT	Renewable Energy Management				
CODE	TKW 4108	credits	3	SEMESTER	6
INSTRUCTOR	Kartika Eka Sari, ST, MT				
TASK FORM	TASK TIME				
Individual/Independent	50 minutes/week/semester				
CASED BASED LEARNING ASSIGNMENT TITLE					
Analysis of the suitability of developing renewable energy sources (Tidal Energy and Organic Waste)					
TASK THEME					
"Suitability of energy generation location with land conditions and potential energy raw materials"					
COURSE LEARNING TOPICS					
Students can evaluate land conditions and potential raw materials for renewable energy plant development sites (tidal and organic waste).					
TASK DESCRIPTION					
Students review and evaluate land conditions and potential raw materials for renewable energy generation sites (tidal and organic waste).					
ASSIGNMENT METHOD					
Individuals: Literature review					
FORM AND FORMAT OF OUTPUT					
<p>a. Object of Study: Case study of Tidal Power Plant Site and Organic Waste</p> <p>b. Form of Output: Review report</p> <p>c. Output Format:</p> <ol style="list-style-type: none"> 1. Substance review: <ul style="list-style-type: none"> • Evaluation of land/meteorological/oceanographic conditions • Evaluation of raw materials for renewable energy sources • Conclusion on the suitability of tidal power plant/organic waste development sites 2. Report format 					

- Word/pdf format maximum 10 pages
- Using evaluation support literature from recent journals

INDICATORS, CRITERIA AND ASSESSMENT WEIGHT

1. Explanation of land/meteorological/oceanographic conditions
2. Explanation of the condition of raw materials for renewable energy sources
3. Explanation of the suitability of renewable energy power plant construction location
4. Report

IMPLEMENTATION SCHEDULE

Literature identification	Week 9 - 10
Review case study report	Week 11 - 12
Report Collection	Week 16

Assessment Rubric (TASK)

Task Type : "Suitability of energy generation sites with land conditions and potential energy raw materials"

Assessment type : Analytic/descriptive rubric and CBL perception rubric

Assessment indicators : ILO 3 and 4

1. Innovatively apply participatory planning processes and methods to Urban and Rural Settlement Planning.
2. Using Environmental Management processes and methods

Assessment criteria

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
Land conditions/meteorology/oceanography	Explain land/meteorological/oceanographic conditions	20	Unable to explain Land/meteorological/oceanographic conditions	Able to explain 30% Land conditions/meteorology/oceanography	Able to explain 60% Land conditions/meteorology/oceanography	Able to explain 90% Land conditions/meteorology/oceanography
Renewable energy source raw material conditions	Describe the condition of raw materials for renewable energy sources	20	Unable to explain the condition of raw materials for renewable energy sources	Able to explain 30% condition of raw materials for renewable energy sources	Able to explain 60% of raw material conditions for renewable energy sources	Able to explain 90% of raw material conditions for renewable energy sources
Suitability of renewable energy power plant construction location	Explain the suitability of renewable energy power plant construction sites	20	Unable to explain the suitability of renewable energy power plant construction sites	Able to explain 30% The suitability of renewable energy power plant construction sites	Able to explain 60% The suitability of renewable energy power plant construction sites	Able to explain 90% The suitability of renewable energy power plant construction sites

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
Report	Completeness and additional references used to review the case study	40	Does not meet the overall requirements: <ul style="list-style-type: none"> • PDF maximum 10 pages • Number of additional references 	Meets 30% of the requirements: <ul style="list-style-type: none"> • PDF maximum 10 pages • Number of additional references 	Meet 60% of the requirements: <ul style="list-style-type: none"> • PDF maximum 10 pages • Number of additional references 	Meets 90% of the requirements: <ul style="list-style-type: none"> • PDF maximum 10 pages • Number of additional references



**BRAWIJAYA UNIVERSITY
FACULTY OF ENGINEERING
PWK DEPARTMENT / S1 PWK STUDY PROGRAM**

ESSAY QUESTION PLAN

SUBJECT	Renewable Energy Management				
CODE	TKW 4108	credits	3	SEMESTER	6
INSTRUCTOR	1. Ismu Rini Dwi Ari, MT, Ph.D. (IRDA) 2. Dr. Septiana Hariyani ST., MT. (SH)				
TEST FORM	TASK TIME				
Essay	60 minutes				
TOPIC DISCUSSION					
<ul style="list-style-type: none">• Social, economic, and technical aspects (Solar, wind, water, and geothermal energy)• Explain the utilization of solar, wind, water and geothermal energy					
COURSE LEARNING TOPICS					
<ul style="list-style-type: none">• Social, economic and technical aspects of solar power as RE• Social, economic and technical aspects of wind power as RE• Social, economic and technical aspects of hydropower as RE• Social, economic and technical aspects of geothermal power as RE• Explain case studies of the utilization of solar, wind, water and geothermal power as RE					
FORM OF TEST					
a. Implementation: Offline (according to the Mid-Exam and Final Exam schedule)					
b. Form: Essay					
c. Topic:					
<ul style="list-style-type: none">• Solar renewable energy sources• Wind power renewable energy sources					

- Hydropower renewable energy sources
- Renewable energy source geothermal power

INDICATORS, CRITERIA AND ASSESSMENT WEIGHT

1. Accuracy in explaining 3 aspects in the utilization of solar, wind, water and geothermal power as RE
2. Accuracy in explaining the calculation method of solar, wind, water and geothermal potentials
3. Accuracy in concluding case studies on the utilization of solar, wind, water and geothermal power

IMPLEMENTATION SCHEDULE	
Mid-Exam	On schedule
Final Exam	On schedule

Assessment Rubric (ESSAY)

Test Type : Essay

Assessment type : Mid-Exam and Final Essay Exam

Assessment indicators : 1LO 1, 1LO 3 and ILO 4

1. Apply research and methods in the field of urban and regional planning
2. Innovatively apply participatory planning processes and methods to Urban and Rural Settlement Planning.
3. Using Environmental Management processes and methods

Assessment criteria

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
Accuracy in explaining 3 aspects of the utilization of solar, wind, water, and geothermal power as RE	Explain 3 aspects of the utilization of solar, wind, water and geothermal power as RE	30	Unable to explain 3 aspects of the utilization of solar, wind, water and geothermal power as RE	Able to explain 30% 3 aspects in the utilization of solar, wind, water and geothermal power as RE	Able to explain 60% 3 aspects in the utilization of solar, wind, water and geothermal power as RE	Able to explain 3 aspects in the utilization of solar, wind, water and geothermal power as RE
Accuracy in explaining the calculation method of solar, wind, water and	Explain the calculation methods of solar, wind, water and	20	Unable to explain the calculation method of solar, wind, water and geothermal	Able to explain 30% of solar, wind, water and geothermal potential calculation	Able to explain 60% of solar, wind, water and geothermal potential calculation	Able to explain 90% of the calculation methods of solar, wind, water and geothermal

Dimensions	Criteria	Maximum Value	Bad 0-55	Simply 56-69	Good 70-80	Very good 81-100
geothermal potential.	geothermal potentials		potential based on ecosystem services	methods based on ecosystem services	methods based on ecosystem services	potential based on ecosystem services
Accuracy in concluding case studies on the utilization of solar, wind, water and geothermal power	Explain the conclusions of case studies on the utilization of solar, wind, water and geothermal power	50	Unable to explain the conclusion of case studies on the utilization of solar, wind, water and geothermal power	Able to explain 30% of case study conclusions on the utilization of solar, wind, water and geothermal power	Able to explain 60% of case study conclusions on the utilization of solar, wind, water and geothermal power	Able to explain 90% of the conclusions of case studies on the utilization of solar, wind, water and geothermal power

