MODUL ENVIRONMENTAL SYSTEM ANALYSIS

MASTER PROGRAM OF ENVIRONMENTAL SCIENCE
SCHOOL OF POSTGRADUATE STUDIES
DIPONEGORO UNIVERSITY

A Modul Descriptions :

Modul design	Environmental System Analysis
Modul level, if applicable	
Code, if applicable	P-CIL-8-208
Subtitles, if applicable	
Courses, if applicable	
Semester(s) in which the module is taught	2nd Semester
Person responsible for the modul	Ir. Setia Budi Sasongko, DEA, Ph.D
Lecturer	1. Ir. Setia Budi Sasongko, DEA, Ph.D 2. Prof. Dr. Ir. Hadiyanto, ST, M.Sc. 3. Prof. Dr. Sunarsih, MSi
Language	*Indonesian and English*
Relations to curriculum	
Type of teaching, contact hours	*Studying:1 x 120 minutes x 16 meetings = 32 hours/week* *Q&A:1x 20 minutes 16 meetings = 5.3 hours/week* *Discussion:1x 20 minutes 16 meetings = 5.3 hours/week* *Presentation:1x 20 minutes 16 meetings = 5.3 hours/week* *Individual assignments: 36 minutes/day = 3 hours/week*
Workload	*(Estimated) workload, divided into contact hours (lecture, exercise, laboratory session, etc.) and private study, including examination preparation, specified in hours,[1] and in total.*
Credit points	*2 credits / 4 ECTS*
Requirements according to the examination regulations	*Minimum attendance of lectures 75%*
Recommended prerequisites	*eg existing competences in…*

Modul objectives/intended learning outcomes	• Able to understand problem with environmental modeling approach • Able to solve environmental problems with an environmental modeling approach.
Content	This course studies the concept of sustainable development that integrates ecological systems to answer environmental problems.
Study and examination requirements and forms of examination	• *Open book and close book* • *Multiple choice, case studies, interviews*
Media employed	*Powerpoint, youtube, website*
Reading List	1. Michel R. Goodman, 1980, Study Notes in System Dynamics, The MIT Press Cambridge, Massachusetts, London, England. 2. Muhammadi, Erman Aminullah, Budhi Soesilo, 2001, "Analisis Sistem Dinamis: Lingkungan Hidup, Sosial, Ekonomi, Manajemen", Penerbit UMJ Press. 3. Chandra, Herry P. dan Christian, Djoni. 2002. Analisa Sistem Manajemen Lingkungan (Iso 14000) Dan Kemungkinan Implementasinya Oleh Para Kontraktor Kelas A Di Surabaya. Dimensi Teknik Sipil, Vol. 4, No. 2, 77-84, September 2002 ISSN 1410-9530 4. Ann, G.E., Suhaiza Zailani, Nabsiah Abd Wahid, (2006),"A study on the impact of environmental management system (EMS) certification towards firms' performance in Malaysia", Management of Environmental Quality: An International Journal, Vol. 17 Iss: 1 pp. 73 – 93

SEMESTER STUDY PLAN

	Study program: Master of Environmental Science			**Faculty: School Of Postgraduated Studies**				
Subject:	**System Analysis and Environmental Modeling**	**Code:** **P-CIL-8-208**		**Credit:2 (4 ECTS)**		**Smt:2**		
Supporting lecturer:	**Ir. Setia Budi Sasongko, DEA, Ph.D** Prof. Dr. Ir. Hadiyanto, ST, M.Sc. Prof. Dr. Sunarsih, MSi							
Learning Outcomes Subject:	◦ Able to understand problems with environmental modeling approach ◦ Able to solve environmental problems with an environmental modeling approach							
Short Description of Courses:	This course studies the concept of sustainable development that integrates ecological systems to answer environmental problems							

1	2	3	4	5	6	7	
Week	**Final Ability of each learning stage**	**Study Materials/ Subjects**	**Learning methods**	**Workload**	**Student Learning Experience**	**Evaluation**	
						Criteria & Indicators	**Weight (%)**
1	Able to mention real cases related to systems approach and systemic thinking	Exploration of real cases related to approach systems and systemic thinking	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5

				minutes/day (16 weeks)			
2	Able to mention real cases related to systems approach and systemic thinking	Discussion of real cases of various system structures and behaviors	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
3	Able to understand simulation cases using Vensim software	Discussion of simulation cases and model behavior using Vensim . software	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
4	Able to understand systems science and modeling	Review of Articles Related to Systems Science and Modeling	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes*	Students listen to the lecturer's explanation and answer the	Presence Activeness in Discussion and Understanding	5

				◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	lecturer's questions, as well as discuss		
5	Able to practice model preparation and simulation	Practice Modeling and Simulation	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
6	Able to understand Structural ModelingPositive, Negative and Oscillation Feedback	Article Review on Positive, Negative and Oscillation Feedback Structured Modeling	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5

				Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)			
7	**Mid-Semester Examination (UTS)**	**Meeting Material 1-7**	**Written test**	**216 minutes of processing time or the equivalent of 0.25 ECTS**	**Students working on UTS questions**	**Completeness and quality of answers and timeliness**	**10**
8	Able to understand Structural ModelingPositive, Negative and Oscillation Feedback	Article Review on Positive, Negative and Oscillation Feedback Structured Modeling	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion Understanding	5
9	Able to understand modeling with case studies	Discussion and presentation of the results of reviews of national and international scientific publications related to environmental management modeling	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion Understanding	5

				Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)			
10	Able to understand problems with a modeling approach based on tree canopy aspects	Assignment to solve flood and landslide problems based on tree canopy aspects	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
11	Able to understand problems with a modeling approach based on tree canopy aspects	Group discussion: cases in the field about flooding caused by deforestation and related to tree canopy aspects and presented	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
12	Able to understand problems with	Presentation on adaptation	Lectures, questions and	216minutes (0.25 ECTS)	Students listen to the lecturer's	Presence	5

	environmental modeling approach	technology activities that can be developed through environmental modeling	answers, and discussions	◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	explanation and answer the lecturer's questions, as well as discuss	Activeness in Discussion and Understanding	
13	Able to understand problems with environmental modeling approach	Presentation on mitigation activities that can be developed through environmental modeling	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x 20 minutes* *Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5
14	Able to understand problems with environmental modeling approach	Mathematical and dynamic environmental modeling presentation	Lectures, questions and answers, and discussions	216minutes (0.25 ECTS) ◦ *Lecture = 1x 120 minutes* ◦ *Q&A = 1 x 20 minutes* ◦ *Discussion = 1 x 20 minutes* ◦ *Presentation = 1 x*	Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss	Presence Activeness in Discussion and Understanding	5

				20 minutes Individual Tasks (Self Work) = 1 x 36 minutes/day (16 weeks)			
16	**Final Semester Exam (UAS)**	**Meeting Materials 1-15 (resume material)**	**Written test**	**216 minutes of processing time or the equivalent of 0.25 ECTS**	**Students working on UAS questions**	**Completeness and correctness of explanation and accuracy of understanding**	**20**
8. Reference List:		1. Arifin Nofri., et.al. 2021. Information System Design Analysis. Cendekia Mulia Mandiri Publisher. Batam 2. Santi Indyah. System Design Analysis. 2020. Nasya Expanding Management Publisher. Pekalongan 3. Mulyani Sri. 2016. System Analysis and Design Method. Systematics Servant. Bandung 4. Sutabri Tata.2012.Information System Analysis.Publisher ANDI. Yogyakarta					