

MODUL HANDBOOK ENVIRONMENTAL SYSTEM ANALYSIS



MASTER PROGRAM OF ENVIRONMENTAL SCIENCE
SCHOOL OF POSTGRADUATE STUDIES
DIPONEGORO UNIVERSITY

Modul Descriptions :

Module designation	Environmental System Analysis
Semester(s) in which the module is taught	2 nd Semester
Person responsible for the module	Prof. Dr. Dra. Sunarsih M.Si Prof.Dr. Ir. Setia Budi Sasongko, DEA Prof. Dr.-Ing Suherman, ST, MT
Language	Indonesian and English
Relation to curriculum	Compulsory for Environmental Engineering Concentration/Specialization
Teaching methods	Powerpoint, youtube, website
Workload (incl. contact hours, self-study hours)	<ul style="list-style-type: none">• Lecture, 2 hours per week• Discussion and presentation (Q&A), 1 hours per week• Individual assignment, 3 hours per week• Total workload for semester = 100 hours
Credit points	2 credits / 4 ECTS
Required and recommended prerequisites for joining the module	No required prerequisite
Module objectives/intended learning outcomes	<ul style="list-style-type: none">• Able to formulate environmental management theory• Able to formulate and carry out scientific research to solve environmental problems• Able to formulate rules, methods through of environmental management to improve the quality of life• Able to solve environmental problems with a technical engineering approach
Content	The environmental system analysis course studies the concept of sustainable development and how to analysis the integrates ecological systems that influences. The course study how to develop model of interrelationship among ecological system with mathematic and or quantitative approach. Dynamic model is one of the approaches for practice
Examination forms	<ul style="list-style-type: none">• Essay• Individual and group assignments
Study and examination	Lecture attendance of at least 75%.

requirements	
Reading list	<ol style="list-style-type: none"> 1. Kwok, A. G., & Grondzik, W. (2018). <i>The green studio handbook: Environmental strategies for schematic design</i>. Routledge. 2. Brunner, P. H., & Rechberger, H. (2016). <i>Handbook of material flow analysis: For environmental, resource, and waste engineers</i>. CRC press. 3. Tian, Y., Govindan, K., & Zhu, Q. (2014). A system dynamics model based on evolutionary game theory for green supply chain management diffusion among Chinese manufacturers. <i>Journal of Cleaner Production</i>, 80, 96-105. 4. Briner, S., Elkin, C., Huber, R., & Grêt-Regamey, A. (2012). Assessing the impacts of economic and climate changes on land-use in mountain regions: A spatial dynamic modeling approach. <i>Agriculture, Ecosystems & Environment</i>, 149, 50-63. 5. Stave, K. (2010). Participatory system dynamics modeling for sustainable environmental management: Observations from four cases. <i>Sustainability</i>, 2(9), 2762-2784. 6. Fishwick, P. A. (Ed.). (2007). <i>Handbook of dynamic system modeling</i>. CRC Press. 7. Down, R. D., & Lehr, J. H. (Eds.). (2005). <i>Environmental instrumentation and analysis handbook</i>. John Wiley & Sons. 8. Muhammadiyah, Erman Aminullah, Budhi Soesilo, 2001, "Analisis Sistem Dinamis: Lingkungan Hidup, Sosial, Ekonomi, Manajemen", Penerbit UMJ Press. 9. Lee, C. C., & Lin, S. D. (2000). <i>Handbook of environmental engineering calculations</i> (pp. 1223-1261). New York: McGraw-Hill. 10. Deaton, M., & Winebrake, J. J. (1999). <i>Dynamic modeling of environmental systems</i>. Springer Science & Business Media. 11. Costanza, R., & Ruth, M. (1998). Using dynamic modeling to scope environmental problems and build consensus. <i>Environmental management</i>, 22, 183-195. 12. Doebelin, E. (1998). <i>System dynamics: modeling, analysis, simulation, design</i>. CRC Press. 13. Weber, W. J., & DiGiano, F. A. (1996). <i>Process dynamics in environmental systems</i>. Wiley.