Module/Course Description

BASICS OF MODELLING FOR FORESTRY AND LANDSCAPE (MNH 419)

A. Module Identity		
1.	Name	Basics of Modelling for Forestry and Landscape
2.	Code	MNH 419
3.	Credit	3 (2-3)
4.	Semester	7
5.	Coordinator	Prof. Dr. Ir. Herry Purnomo, M.Comp.
6.	Lecturers	Prof. Dr. Ir. Herry Purnomo, M.Comp. Dr. Ir. Budi Kuncahyo, MS.
7.	Language	Indonesian
8.	Program(s) in which the course is offered	Internal department: Forest Management Study Program Other departments: ……..
9.	Type of teaching	a. Traditional classroom: 100 % b. Blended system: Traditional classroom….%, Online….% c. e-Learning system: ……..% d. Others: ……..%

B. Workload of course components (total contact hours and credits per semester)

Credit		Contact Hours				Self-Study	Other	Total
SKS *)	ECTS	Lecture	Exercise	Laboratory	Practice			
3		**28**			**42**	**56**		**126**

**) Semester credit unit according to the Indonesian higher educational system*
1 credit unit lecture = 2 hours/ week for lecture and 2 hours/ week for self-study within 14 weeks/ semester
1 credit unit class exercise or laboratory or field practice = 3 hours/week within 12-14 weeks/semester
***) 1 hour for lecture= 50 minutes; 1 hour for class exercise or laboratory or field practice = 60 minutes*

C. Module Objective (Learning Outcomes)
Student having the ability to think systematically and to develop the simple simulation models in forestry and landscape

D. Detailed Course Learning Outcomes (LO) in Relation to Learning Domains, Teaching Strategies, and Assignment Methods			
No.	**LO in Learning Domains**	**Teaching Strategies**	**Assessment Methods**
a.	**Knowledge**		
1.	Students are able **to comprehend** the forestry and landscape issues holistically	Presentation of teaching materials. Debriefing sessions	Midterm Exam (5%)
2.	Students are able **to explain** the landscape approach	Presentation of teaching materials. Debriefing sessions	Midterm Exam (5%)
3.	Students are able **to interpret** the synergies and trade-offs of forest and landscape management	Presentation of teaching materials Debriefing sessions Practice Lessons	Midterm Exam; Independent Task (5%)
4.	Students are able **to outline** the driver factor and their effect on landscape change	Presentation of teaching materials Debriefing sessions Practice Lessons	Midterm Exam; Independent Task (5%)
5.	Students are able **to explain** the model of climate change mitigation and adaptation	Presentation of teaching materials Debriefing sessions Practice Lessons	Midterm Exam; Independent Task (10%)
6.	Students are able **to outline** the basics of adaptive and collaborative management in the landscape management	Presentation of teaching materials Debriefing sessions Practice Lessons	Midterm Exam; Independent Task (10%)
7.	Students are able **to illustrate** the interaction between natural resources, management techniques, actors, institutions, and governance	Presentation of teaching materials Debriefing sessions Practice Lessons	Midterm Exam; Independent Task (10%)

8.	Students are able **to explain** the systems approaches and multi-disciplinary in forestry and landscape management	Presentation of teaching materials Debriefing sessions Practice Lessons	Final Exam; Independent Task (5%)
b.	**Skills**		
1.	Students are able **to build** the system dynamic model in landscape management	Presentation of teaching materials Debriefing sessions Practice Lessons	Final Exam; Independent Task (15%)
c.	**Competences:**		
1.	Students are able **to create** the models and future scenarios for landscape and forest management based on the ecological, economic and social aspect	Presentation of teaching materials Debriefing sessions Practice Lessons	Final Exam; Independent Task (30%)

E. Module Content		
List of Topic	**Number of Weeks**	**Contact Hours**
A general model of the landscape and its components	1	2
Landscape management objectives and indicators	1	2
The model of interaction between forestry, plantations, food agriculture, and mining	1	2
Population growth, markets, international pressure and climate change	1	2
The reciprocal interaction between landscape with climate change mitigation and adaptation	1	2
The basis for landscape management and adaptive management of natural resources	1	2
Landscape governance	1	2
Complex system theory	1	2
System dynamics modeling	2	4
Landscape management	4	8

F. Course Assessments			
No.	**Assessment Type *)**	**Schedule (Week Due)**	**Proportion of the Final Mark**
1.	Mid-term examination	8th week	40 %
2.	Independent task	End of each week	20 %
3.	Final examination	16th week	40 %

**) Example: mid-term examination, final examination, quiz, homework, project, etc.*

G. Media Employed
- Classroom - Laptop - LCD - Modeling software - Microphone (loudspeaker)

H. Learning Resources

h1. Textbooks:

1. Chapin III FS, Kofinas GP, Folke C (Eds.). 2009. *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World*. Springer. 402p.
2. Chomitz KM. 2007. *At Loggerheads? Agricultural expansion, poverty reduction and environment in the tropical forests*. The World Bank, Washington DC. 284pp.
3. Grant JW, Pedersen EK, Marin SL. 1997. *Ecology and Natural Resource Management: System Analysis and Simulation.* Reading: Addison-Wesley.
4. Kuncahyo. 2006. *Model simulasi pengaturan hasil lestari yang berbasis kebutuhan masyarakat desa hutan*. Disertasi. IPB, Bogor.
5. Lee KN. 1993. *Compass and Gyroscope: Integrating Science and Politics for the Environment*. Washington D.C.: Island Press.
6. Ostrom E. 2007. Sustainable social-ecological systems: an impossibility. Presented at the 2007 Annual Meetings of the American Association for the Advancement of Science, "Science and Technology for Sustainable Well-Being," 15–19 February in San Francisco and Proceeding of the National Academy of Sciences (USA).
7. Purnomo H. 2012. *Pemodelan dan Simulasi untuk Pengelolaan Adaptif Sumberdaya Alam dan Lingkungan*. Bogor: IPB Press
8. Schlaepfer R. 1997. *Ecosystem-Based Management of Natural Resources: a Step Towards Sustainable Development.* Occasional paper no. 6. Austria: IUFRO.
9. Schlaepfer R, Elliott C. 2000. *Ecological and landscape considerations in forest management: The end of forestry*. In K. von Gadow, T. Pukkala & M. Tom6 (Eds), Sustainable forest management (p. 1-67). Dordrecht, The Netherlands: Kluwer Academic Publishers Shafik N. 1994. Economic development and environmental quality: an econometric analysis. Oxford Economic Papers 46 (October): 757–773
10. Sterman JD. 2000. *Business Dynamics: Systems Thinking and Modeling for a Complex World. Madison* Wisconsin: Irwin McGraw-Hill.

h2. Journal:

1. Purnomo H, Suyamto D, Irawati RH. 2013. Harnessing the climate commons: an agent-based modelling approach to making reducing emission from deforestation and degradation (REDD) + work. *Mitigation and Adaptation Strategies for Global Change.* 18(3): 471-489
2. Purnomo H, Mendoza GA. 2011. A system dynamics model for evaluating collaborative forest management: A Case Study in Indonesia. *International Journal of Sustainable Development & World Ecology.* 18(2): 164–176

3. Purnomo H, Guizol P, Muhtaman DR. 2009. Governing the teak furniture business: A global value chain system dynamic modeling approach. *Environmental modelling and software*. 24 (12): 1391-1401.
4. Purnomo H, Guizol P. 2006. Simulating forest plantation co-management with multi-agent-system. *Mathematical and Computer Modeling.* 44:535-552
5. Purnomo H, Mendoza GA, Prabhu R, Yasmi Y. 2005. Developing multi-stakeholder forest management scenarios: a multi-agent system simulation approach. *Forest Policy and Economics*. 7: 475– 491
6. Purnomo H, Yasmi Y, Prabhu R, Hakim S, Jafar A, Suprihatin. 2003. Collaborative modeling to support forest management: qualitative systems analysis at Lumut Mountain Indonesia. *Small-scale Forest Economics, Management and Policy*. 2(2): 259-275