Module/Course Description

FOREST BIOMETRICS (MNH 316)

A. Module Identity		
1.	Name	Forest Biometrics
2.	Code	MNH 316
3.	Credit	3 (2-3)
4.	Semester	5
6.	Coordinator	Dr. Ir. Budi Kuncahyo, MS.
7.	Lecturers	Prof. Dr. Ir. Herry Purnomo, M.Comp. Dr. Ir. Budi Kuncahyo, MS. Dr. Ir. Teddy Rusolono, MS.
8.	Language	Indonesian
9.	Program(s) in which the course is offered	Internal department: Forest Management Study Program Other departments: ……..
10.	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	Class Exercise	Laboratory	Field Practice			
3		**28**	**36**			**56**		**120**

**) 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)
Students having the ability to quantitative and systemic analysis of forestry problems and implemented on forest management scenarios

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 role of forest biometrics in forest management Biometrics	Presentation and discussion	Midterm Exam and Practicum Test (5%)
2.	Students are able **to explain** the notion of variables, scale of measurement, the influence on the precision and accuracy of the data, the limitations of the analysis tool and how to choose the appropriate analysis tools.	Presentation and discussion	Midterm Exam and Practicum Test (5%)
3.	Students are able **to explain** the general systems theory (general system theory), systemic thinking (systems thinking) and the possibility of its application.	Presentation, discussion and task modelling	Final Exam and Practicum Test (5%)
4.	Students are able **to identify** the basic behaviour of forest and environmental management system	Presentation, discussion and task modelling	Final Exam and Practicum Test (20%)
b.	**Skills**		
1.	Students are able **to outline** the relationship between variables of a system of forest ecosystem or forestry systems, and they are able **to apply** the technique of analysis of the relationship between these variables.	Presentation, discussion and task modelling	Midterm Exam and Practicum Test (20%)
2.	Students are able **to identify** the problems of forestry with	Presentation, discussion and task modelling	Midterm Exam and Practicum Test (10%)

	the response data is chopped and categories, and are able **to operate** the relevant data analysis techniques.		
3.	Students are able **to outline** on the concept of growth and yield and they are able **to demonstrate** the mathematical/statistical approach to modelling growth	Presentation, discussion and task modelling	Midterm Exam and Practicum Test (10%)
4.	Students are able **to show** examples on the phasing of system modelling	Presentation, discussion and task modelling	Final Exam and Practicum Test (5%)
c.	**Competences:**		
1.	Students are able **to create** a simple system dynamics model in the field of forest management	Presentation, discussion and task modelling	Final Exam and Practicum Test (10%)
2.	Students are able **to compose** models of qualitative and semi-quantitative management of forests and the environment.	Presentation, discussion and task modelling	Final Exam and Practicum Test (10%)

E. Module Content		
List of Topic	**Number of Weeks**	**Contact Hours**
Introduction	**1**	**2**
Data Structures and Analysis Compatible	**1**	**2**
Analysis of Relationships One or More Variables	**2**	**4**
Count Data Analysis and Categorical	**2**	**4**
Approach to Growth Model	**1**	**2**
Systems Theory	**1**	**2**
Stages of Modeling Systems	**1**	**2**
The Dynamics of The System	**1**	**2**
The Structure and Behavior of The Basic System	**3**	**6**
Soft Systems Methodology and Fuzzy Cognitive Mapping	**1**	**2**

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

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

G. Media Employed

- Classroom
- Laptop
- LCD
- Microphone (loudspeaker)
- Practical tools

H. Learning Resources

h1. Textbooks:

1. Grant JW, Pedersen EK, Marin SL. 1997. *Ecology and Natural Resource Management: System Analysis and Simulation.* Reading: Addison-Wesley.
2. Lee KN. 1993. Compass and Gyroscope: *Integrating Science and Politics for the Environment.* Washington D.C.: Island Press.
3. Prodan, Michail. 1968. *Forest Biometrics*. Pergamon Press. London.
4. Purnomo H. 2012. *Pemodelan dan Simulasi untuk Pengelolaan Adaptif Sumberdaya Alam dan Lingkungan*. Bogor: IPB Press
5. Sokal, RR and Rohlf FJ. 1995. *Biometry: The Principles and Practice of Statistics in Biology Research.* Third Edition. Freeman and Company, New York.
6. Sterman JD. 2000. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Madison, Wisconsin: Irwin McGraw-Hill.
7. van Laar, Anthonie. 1999. *Forest Biometry*. Sappi Forest, Stellenbosch.

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