Module/Course Description

INTEGRATED WATERSHED MANAGEMENT (MNH 317)

A. Module Identity		
1.	Name	Integrated Watershed Management
2.	Code	MNH 317
3.	Credit	3 (2-3)
4.	Semester	6
5.	Coordinator	Dr. Ir Nana Mulyana Arifjaya, M.Si
6.	Lecturers	Dr. Ir Nana Mulyana Arifjaya, M.Si Dr. Ir. Hendrayanto, M.Agr
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**	**15**		**21**	**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 being able to clarify the linkages among forest ecosystems in watershed area, watershed problem, and watershed handling solution from upstream to downstream related to the biophysical and socio-economic conditions.

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 explain** watershed problems, function of watershed forest-based separation; understand watershed area problems and conditions	Presentation Debriefing (Q/A) Tasks	Verbal and Written Test (Midterm Exam) 5%
2.	Students are able **to comprehend** the forest ecosystem from coast to top of the mountain	Discussions by task completion results Presentation Task	Verbal and Written Test (Midterm Exam) 10%
b.	**Skills**		
1.	Students are able **to identify** watershed characteristics based on type of forest, watershed area morphometric, land usage, and institutional of watershed area	Discussions by task completion results Presentation Task Practical Trainings	Verbal and Written Test (Midterm Exam) 10%
2.	Students are able **to conduct** the land evaluation, land capability analysis, and land usage	Discussions by task completion results Presentation Task Practical Trainings	Verbal and Written, Calculation Test (Midterm Exam) 10%
3.	Students are able **to operate** the erosion calculation, sedimentation, and research of critical watershed	Discussions by task completion results Presentation Task Practical Trainings	Verbal and Written, Calculation Test (Midterm Exam) 10%
4.	Students are able **to select** the most appropriate choice and a combination of soil and water	Discussions by task completion results Presentation	Verbal and Written, Calculation Test (Midterm Exam) 10%

	between vegetative and civil engineering for watershed rehabilitation	Task Practical Trainings	
5.	Students are able **to compile** the watershed area management planning process	Discussions by task completion results Presentation Task Practical Trainings	Verbal and Written, Calculation Test (Final Exam) 5%
6.	Students are able **to explore** the watershed institution and distribution of roles	Discussions by task completion results Presentation Task Practical Trainings	Verbal and Written (Final Exam) 5%
7.	Students are able **to operate** the application of SWAT / GIS in watershed management	Discussions by task completion results Presentation of advanced materials Task	Verbal and Written, Calculation (Final Exam) 20%
c.	**Competences:**		
1.	Students are able **to criticize** the diversity, issues, and socio-economic conditions of watershed	Discussions by task completion results Presentation of advanced materials Task	Verbal and Written (Final Exam) 5%
2.	Students are able to compare the tool to measure the progress program and activities based socio-economic for development of watershed area management models	Discussions by task completion results Presentation of advanced materials Task	Verbal and Written, Calculation (Final Exam) 10%

E. Module Content		
List of Topic	**Number of Weeks**	**Contact Hours**
Introduction	**1**	**2**
Relationship Ecosystem Types in Bio-region	**1**	**2**
Watershed Characterized	**1**	**2**
Land Evaluation	**1**	**2**
Critical Watershed and its causes	**2**	**4**
Determination of Technique watershed conservation	**2**	**4**
Analysis of Watershed Area Management Approach	**1**	**2**
Analysis of the role and watershed institution	**1**	**2**
Community approach (community based approach) in watershed area Management	**1**	**2**
Socio-economic approach in the rehabilitation of watershed	**1**	**2**
Application of SWAT / GIS in watershed management	**2**	**4**

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
- Microphone (loudspeaker)
- Practical tools

H. Learning Resources

1. Arsyad S. 1992. *Teknik Konservasi Tanah dan Air*. IPB Press
2. Biswas AK. 1997. *Water Resources*. New York. (US): MCGraw-Hill. ISBN0-07-005483-5
3. Brooks KN, Ffolliott PF, Gregersen HM, and DeBano LF. 1997. *Hydrology and the Management of Watersheds. 2nd ed.* Iowa State University Press, Ames. 502p. ISBN 0-8138- 2287-4.
4. Bruijnzeel LA. 1990. *Hydrology of Mooist Tropical Forest and Effect of Conversion;*

State of Knowledge review. Unesco

5. Davenport TE. *The Watershed Project Management Guide.* 2003. New York (US): Lewis Publishers. ISBN 1-58716-092-7
6. Grigg EN. 1996. *Water resources mangement.* New York (US): McGraww Hill. ISBN 0-07-024782-X
7. Haan CT, *et all*. 1982. *Hydrologic Modeling of Small Watershed*. ASAE. ISBN 0-416150-44-6
8. Heathcote IW. *Integrated Watershed Management Pronciples and Practice*. John Wiley & Sons, Inc. ISBN 0-47-18338-5
9. Pritchett WL, Fisher RF. 1987. *Properties and Management of Forest Soils.* 2nd ed. New York (US): John Wiley and Sons. 494p. ISBN 0-471-89572-5.
10. Reimold RJ. *Watershed Management*. 1998. McGraw-Hill. ISBN 0-07-052299-5
11. SWAT Global Aplication. 2008. *World Association of Soil and Water Conservation*. Special Publication No 4.
12. Ward A, Elliot WJ. 1995. *Environmental Hydrology*. Lewis Publishers. ISBN0-87371-886-0