Module/Course Description

SENSING FORESTRY GEOMATICS (MNH 315)

A. Module Identity		
1.	Name	Forest Biometrics
2.	Code	MNH 315
3.	Credit	3 (2-3)
4.	Semester	6
5.	Coordinator	Prof. Dr. Ir. I Nengah Surati Jaya, M.Agr.
6.	Lecturers	Prof. Dr. Ir. I Nengah Surati Jaya, M.Agr. Dr. Ir. M. Buce Saleh, MS. Dr. Nining Puspaningsih, M.Si.
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	Class Exercise	Laboratory	Field Practice			
3		**28**	**6**	**33**		**56**		**123**

**) 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 explain remote sensing technology and geomatics in forest resource management and they are able to use technology and techniques for analyzing image data for classification of forest types and estimation of forest stocks and their changes.

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 recognize** the concepts of geomatics and remote sensing and why they are required in forestry	Presentation of teaching materials FAQ	Midterm Exam (5%)
2.	Students are able **to explain** the scope of geomatics and remote sensing in forestry	Presentation of teaching materials Discussion and question and answer	Midterm Exam and Individual Task (5%)
3.	Students are able **to outline** the SIG concepts and links between the forestry science	Presentation of teaching materials Discussion and question and answer	Final Exam and Individual Task (5%)
b.	**Skills**		
1.	Students are able **to operate** the geometric correction and registration of satellite images	Presentation of teaching materials Discussion and question and answer Practicum	Midterm Exam and Individual Task (10%)
2.	Students are able **to produce** the natural color composite image and standard false image, as well as **to apply** the visual interpretation techniques of forest types and forest ecosystems	Presentation of teaching materials Discussion and question and answer Practicum	Midterm Exam and Individual Task (7%)
3.	Students are able **to operate** the image improvement	Presentation of teaching materials	Midterm Exam and Individual Task (7%)

	techniques and image enhancement for the detection of forest ecosystem attributes	Discussion and question and answer Practicum	
4.	Students are able **to use** the digital classification techniques for forest cover and land	Presentation of teaching materials Discussion and question and answer Practicum	Midterm Exam and Individual Task (10%)
5.	Students are able **to demonstrate** the monitor changes in forest cover with multi-time satellite technology	Presentation of teaching materials Discussion and question and answer Practicum	Midterm Exam and Individual Task (7%)
6.	Students are able **to build** the spatial data for forestry	Presentation of teaching materials Discussion and question and answer Practicum	Final Exam and Individual Task (5%)
7.	Students are able **to organize** the spatial database for forestry	Presentation of teaching materials Discussion and question and answer Practicum	Final Exam and Individual Task (10%)
8.	Students are able **to manipulate** the spatial operations	Presentation of teaching materials Discussion and question and answer Practicum	Final Exam and Individual Task (10%)
9.	Students are able **to construct** the spatial models for forest planning	Presentation of teaching materials Discussion and question and answer Practicum	Final Exam and Individual Task (5%)
10.	Students are able **to operate** the spatial simulation	Presentation of teaching materials	Final Exam and Individual Task (7%)

	modelling for forest management	Discussion and question and answer Practicum	
c.	**Competences:**		
1.	Students are able to compose the presentation of forestry spatial information	Presentation of teaching materials Discussion and question and answer Practicum	Final Exam and Individual Task (7%)

E. Module Content		
List of Topic	**Number of Weeks**	**Contact Hours**
Introduction; Concepts of Geomatics and Remote Sensing	**1**	**2**
Scope of Geomatics and Remote Sensing in Forestry	**1**	**2**
Geometric Correction and Registration of Satellite Image	**1**	**2**
Composite Color to Vegetation and Visual Interpretation of Forest Ecosystem	**1**	**2**
Image improvement techniques and image enhancement for the detection of forest ecosystem attributes	**1**	**2**
Digital Classification of Forest Cover and Land	**1**	**2**
Detection and Monitoring with Satellite Imagery	**1**	**2**
SIG Concepts and links between the Forestry Science	**1**	**2**
Spatial data for Forestry	**1**	**2**
Spatial database for Forestry	**1**	**2**
Manipulation and Analysis of Spatial Operations	**1**	**2**
Spatial Modelling for Forest Planning	**1**	**2**
Spatial Simulation Modelling for Forest Management	**1**	**2**
Presentation of Forestry Spatial Information	**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.	**Individual 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. Aeronoff S. 1995. *Geographic Information System: A Management Persepective*. Wld. Publication.
2. Bettinger P, Mg Wing. 2004. *Gis Application in Forestry and Natural Resource Management.*
3. Burrough PA. 1986. *Principles of Geographical Information Systems for Land Resources Assessment.*
4. Esri. 1996. *Using The Arcview Spatial Analyst.*
5. Goodchild M, et al. 1996. *Gis and Environmental Modeling: Progress and Research Issues.*
6. Gonzales RC, Wintz P. 1987. *Digital Image Processing*. Machachussetts: Addisson wesley Publishing Comp. 502 p.
7. Howard J. 1991. *Remote Sensing of Forest Resource. Theory znd Application*. Chapman and Hall. 418 p.
8. Jaya INS. 1996. *Penginderaan Jauh Satelit*. Fakultas Kehutanan IPB. Diktat kuliah.
9. Jaya INS. 2002. *Aplikasi Sistem Informasi Geografis untuk Kehutanan*. Bogor: IPB Press
10. Jensen JR. 1986. *Introductory Digital Image Processing. A Remote Sensing Perspective*. Prentice-Hall.
11. Lillesand T, Kiefer R. 1994. *Remote Sensing and Image Interpretation*. New York: John Wiley and Sons, Inc. 750 p.
12. Richards, J. A. 1993. *Remote Sensing Digital Image Analysis: An Introduction*. Springer-Verlag.
13. Sabin, FS Jr. 1981. *Remote Sensing and Photo-Interpretation*. New York: WH Freeman and comp.
14. Swain PH, Davis SM. 1976. *The Remote Sensing: A Quantitative Approach*. New York: Mc-Grawhill.
15. Wilkie DS, Finn JT. 1996. *Remote Sensing Imagery For Natural Resource Monitoring*. Columbia University Press.