Module/Course Description
Forest Utilization Operation (MNH 433)

A. Module Identity		
1.	Name	Forest Utilization Operation
2.	Code	MNH 433
3.	Credit	3 (2-3)
4.	Semester	7 (odd)
5.	Pre-requisite	-
6.	Coordinator	Prof. Dr Ir. Juang R. Matangaran, MS
7.	Lecturers	1. Prof. Dr Ir. Juang R. Matangaran, MS 2. Dr. Ir. Gunawan Santosa, MS 3. Dr. Ujang Suwarna, S.Hut, MSc 4. Dr. Efi Y Yovi, S.Hut. MSc
8.	Language	Indonesian
9.	Program(s) in which the course is offered	Internal department: Forest Management Study Program Other departments: all study programs in IPB University as election course
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**	**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)
After attending this course students are able to design forest harvesting plans, determine and calculate the amount of harvesting machine needs, design the allocation of harvesting machine usage based on space and time, labor requirements, characteristics and groups of types of non-wood forest products and harvesting techniques, able explain the philosophical foundation and concept of Forest Resource Utilization (PSDH) based on the utilization of forest functions, including utilization of environmental services, forest carbon dynamics and cycles, and forest carbon sequestration options.

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 about forest harvesting equipment and machines, types and performance of	Lectures, discussion, tutorials, practice	Authentic assessment of the completeness and correctness in explanation, understanding,

		questions	and analysis 5%
2.	Students are able to explain the selection of equipment and calculate the number of equipment and harvesting machine needs	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
3.	Students are able to explain the impact of heavy equipment/harvesting machines usage in the forest	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
4.	Students are able to explain the philosophical foundation, concepts and scope of PSDH, and able to explain the values of environmental services for the welfare of society	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
5.	Students are able to explain the importance of forest carbon in sustainable forest management and in overcoming the problem of climate change	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 5%
6.	Students are able to explain the understanding of NTFPs, the general characteristics of NTFPs, their relevance to community empowerment and the laws and regulations.	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
7.	Students are able to explain the types of resins, mechanism of their formation, harvesting techniques and efforts to increase productivity and preservation of yields and stands.	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 5%
8.	Students are able to explain the planning of cutting plots and feasible areas for cutting	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
9.	Students can explain the estimated volume of logs harvested and compare with potential survey data	Lectures, discussion, tutorials, practice questions	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
b.	**Skills**		
1.	Students are able to give examples of forest harvesting equipment and machines, types and performance of harvesting machines in natural forests and plantations, along with the weaknesses and strengths of these machines	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis
2.	Students are able to choose equipment and calculate the number of equipment and harvesting machine requirements	Presentation, practicum, and discussion as well as independent/	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis

		group assignments	
3.	Students are able to give examples from a case study in Indonesia related to the impact of using heavy equipment / harvesting machines in the forest	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis
4.	Students are able to explore the role of forest carbon utilization in sustainable forest management and the development of carbon use in Indonesia and the world nowadays	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis
5.	Students are able to give examples of the utilization of NTFPs in Indonesia, along with their opportunities and challenges	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis
6.	Students are able to determine the needs of forestry technical personnel in terms of both the number and qualifications required.	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 5%
7.	Students are able to determine the amount of forest harvesting equipment and schedule equipment operations based on time and space.	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
8.	Students are able to plan felling plots and areas suitable for cutting, and estimate the volume of logs harvested by comparing with potential survey data	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis
9.	Students can determine the location of the skid trail, location and area of the Timber Collection (TPn) with proper consideration	Presentation, practicum, and discussion as well as independent/ group assignments	Authentic assessment of the completeness and correctness in explanation, understanding, and analysis 10%
c.	**Competences:**		
1.	Students demonstrate a willingness to participate in the class activities	Lecturer's explanation, discussion	Authentic assessment
2.	Students are able to complete all tasks and participate in class discussion	Lecturer's explanation, discussion, homework/ assignment	Authentic assessment

E. Module Content		
List of Topic	**Number of Weeks**	**Contact Hours**
Forest harvesting machinery and equipment, types and performance of harvesting machines in natural forests and plantations	1	2
selection of equipment and calculation of the number of harvesting equipment and machine needs	2	4

Impacts of using heavy equipment / harvesting machines in the forest	1	2
Utilization of Environmental Services	1	2
Utilization of Forest Carbon	1	2
NTFP Management	1	2
NTFPs in the form of resins	1	2
Forest Harvesting Workforce Planning	1	2
Harvesting Equipment Scheduling and Placement	1	2
Planning of cutting plots and feasible areas for cutting	2	4
Estimated volume of log production	1	2
Determination of the location of skid trails, location and area of the Timber Collection (TPn)	1	2

F. Course Assessments

No.	Assessment Type *)	Schedule (Week Due)	Proportion of the Final Mark
1.	Mid-Term Examination	The 8th Week	35%
2.	Final Examination	The 16th week	35%
3.	Practical Report/ Homework	Minimal 4 times in a semester	30%

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

G. Media Employed

Laptop, LCD, Microphone, White Board, Marker, Pointer

H. Learning Resources

h1. Textbooks:

1. Åstrand PO, Rodahl K. 1986. *Textbook of Work Physiology: Physiological Bases of Exercise.* New York (US): McGraw-Hill.
2. Barret D. 1984. *The Engine.* DTAFE Publication
3. Chaffin DB, Andersson GB, Martin BJ. 1999. *Occupational biomechanics.* Third Edition. New York (US): John Wiley & Son Inc.
4. FAO, 1999. *Code Practice for Forest Harvesting in Asia Pasific.* Bangkok (TH): Thammada Press Co.Ltd.
5. Kroemer KHE, Grandjean E. 1997. *Fitting the Task to the Human: A Textbook of Occupational Ergonomics.* Fifth edition. Oxfordshire (UK): Taylor & Francis.
6. Nugroho B. 1995. *Perencanaan Pemanenan Kayu.* Bogor (ID): Fakultas Kehutanan IPB.
7. United Tractor. 1984. *Manajemen Alat-Alat Besar (Teknik Dasar Pemilihan, Pemakaian dan Pengelolaan Alat-alat Besar).* Jakarta (ID): PT United Tractors.
8. Wickens CD, Gordon SE, Liu Y. 1997. *An Introduction to Human Factors Engineering.* Boston (US): Addison-Wesley Educational Publishers Inc.
9. Permenaker No. 5/MEN/1996 on SMK3