

## Module/Course Description

### FOREST PRODUCTS PROCESSING (HHT 202)

A. Module Identity		
1.	Name	Forest Products Processing
2.	Code	HHT 202
3.	Credit	2 (2-0)
4.	Semester	4
5.	Coordinator	Prof. Dr. Ir. I Wayan Darmawan, M.Sc
6.	Lecturers	Prof. Dr. Ir. I Wayan Darmawan, M.Sc Dr. Ir. Dede Hermawan, M.Sc. Dr. Istie Sekartining Rahayu, S.Hut., M.Si. Irsan Alipraja, S.Hut., M.Si., M.Sc. Lukmanul Hakim Zaini, S.Hut., M.Sc.
7.	Language	Indonesian
8.	Program(s) in which the course is offered	Internal department: - Other departments: Technology of Forest Products Programme
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			
<b>2</b>		<b>28</b>				<b>56</b>		<b>84</b>

\*) 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)**

The student having the ability to comprehend the basics of forest product processing technologies which include aspects; raw materials, processing technology, nature and quality of products, product uses, and development prospects.

**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
<b>a.</b>	<b>Knowledge</b>		
1.	Students are able <b>to recognize</b> the conditions, potential, and prospects of the industrial processing of forest products, the nature of raw materials from forest products and other raw materials	Presentation of teaching materials. Debriefing sessions	Midterm Exam
2.	Students are able <b>to explain</b> the sawmill technology including aspects of raw materials, processing, the machinery of processing, as well as the properties and product quality	Presentation of teaching materials. Debriefing sessions	Midterm Exam
3.	Students are able <b>to explain</b> the importance of wood drying, wood drying techniques, drying schedules, defects in drying and ways to control it	Presentation of teaching materials. Debriefing sessions	Midterm Exam
4.	Students are able <b>to explain</b> the importance of wood preservation, wood destroying factors, types of preservatives, and techniques of wood preservation	Presentation of teaching materials. Debriefing sessions	Midterm Exam
5.	Students are able <b>to explain</b>	Presentation of teaching	Midterm Exam

	the technology of making plywood including aspects of raw materials, manufacturing processes, the nature and quality of products, as well as its usability and development prospects	materials. Debriefing sessions	
6.	Students are able <b>to explain</b> the technology of making particle boards including aspects of raw materials, manufacturing processes, the nature and quality of products, as well as its usability and development prospects	Presentation of teaching materials. Debriefing sessions	Final Exam
7.	Students are able <b>to explain</b> the technology of making fibreboard including aspects of raw materials, manufacturing processes, the nature and quality of products, as well as its usability and development prospects	Presentation of teaching materials. Debriefing sessions	Final Exam
8.	Students are able <b>to explain</b> the technology of pulp and paper manufacturing covering aspects of raw materials, types of pulping processes, pulp bleaching processes, paper-making process, as well as controlling pollution of the pulp and paper industry	Presentation of teaching materials. Debriefing sessions	Final Exam
9.	Students are able <b>to outline</b> the types of potential non-timber forest products, processing, types and properties of products, as well	Presentation of teaching materials. Debriefing sessions	Final Exam

	as its usability and development prospects		
10.	Students are able <b>to outline</b> the various biomass energy potential, energy conversion techniques, and tool development in relation to energy efficiency	Presentation of teaching materials. Debriefing sessions	Final Exam

### E. Module Content

List of Topic	Number of Weeks	Contact Hours
<b>Introduction</b>	<b>1</b>	<b>2</b>
<b>Wood Sawmill</b>	<b>2</b>	<b>4</b>
<b>Wood Drying</b>	<b>1</b>	<b>2</b>
<b>Wood Preservation</b>	<b>1</b>	<b>2</b>
<b>Plywood</b>	<b>2</b>	<b>4</b>
<b>Particle Board</b>	<b>1</b>	<b>2</b>
<b>Fiberboard</b>	<b>1</b>	<b>2</b>
<b>Pulp and Paper</b>	<b>2</b>	<b>4</b>
<b>Non-Timber Forest Products</b>	<b>2</b>	<b>4</b>
<b>Alternative Energy</b>	<b>1</b>	<b>2</b>

### F. Course Assessments

No.	Assessment Type *)	Schedule (Week Due)	Proportion of the Final Mark
1.	<b>Mid-term examination</b>	<b>8<sup>th</sup> week</b>	<b>50 %</b>
2.	<b>Final examination</b>	<b>16<sup>th</sup> week</b>	<b>50 %</b>

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

### G. Media Employed

<ul style="list-style-type: none"> <li>- Classroom</li> <li>- Laptop</li> <li>- LCD</li> <li>- Microphone (loudspeaker)</li> <li>- Whiteboard</li> </ul>
--

## H. Learning Resources

1. Baldwin RF. 1995. *Plywood and Veneer-Based Products: Manufacturing Practices*. Miller Freeman Books.
2. Casey JP. 1980. *Pulp and Paper: Chemistry and Chemical Technology. Vol. I dan II*. New York (US): John Wiley & Sons Publ.
3. Fadlinurjaji LM, Ruhendi S. 1980. *Diktat Penggergajian*. Bogor (ISD: Fahutan IPB.
4. FAO. *Noil-Wood Forest Products*. Rome: FAO.
5. Fearer H, et.al. 1975. *Wood Materials and Processes*. Illinois (US): Chas A. Bennett Co. Inc.
6. Haygreen JG, Bowyer JL. 1982. *Forest Products and Wood Science: An Introduction*. Iowa State Chem. Press.
7. Hunt GM, Garratt GA. 1986. *Wood Preservation*. USA: The American Forestry Series.
8. Koch P. 1964. *Wood Machining Process*. New York (US): Ronald Press.
9. Kollmann FFP, Kucuzi IIW, Stamm AJ. 1991. *Principle of Wood Science and Technology. Vol I dan II*. Berlin (DE): Springer-Verlag.
10. Maloney TM. 1977. *Modern Particleboard and Dry-Process Fiberboard Manufacturing*. San Fransisco (US): Miller Freeman.
11. Panshin AJ, De Zeeuw C. 1980. *Textbook of Wood Technology*. New York (US): Mc Graw-Hijl.
12. Pizzi A. (Ed). 1983. *Wood Adhesive: Chemistry and Technology*. New York (US): Miracle Dekker.
13. Rydholm SA. 1965. *Pulping Process*. New York (US): Inierscience Publ.
14. Smook GA. 1982. *Handbook for Pulp and Paper Technologists*. Tappi Atlanta, Georgia & Ca. Pulp Pap, Assoe. Montreal.
15. Sofyan IC, Suryana J. 1989. *Hasil Hutan Non Kayu*. Bogor (ID): Fakultas Kehutanan IPB.
16. Tsoumis G. 1991. *Science and Technology of Wood; Structure, Properties and Technology*. Van Nostrand Reinhold. USA,
17. Walker JCF. 1993. *Primary Wood Processing; Principle and Practice*. London (UK): Chapman & Hall.
18. Wiliston M. 1978. *Saws: design, selection, operation and maintenance*. Miller Freeman Publ.
19. Zabel RA, Morrell JJ. 1992. *Wood Microbiology: Decay and Prevention*. New York (US): Academic Press Inc.