

Module/Course Description

FOREST PRODUCTS AS RAW MATERIALS (HHT 201)

A. Module Identity		
1.	Name	Forest Products as Raw Materials
2.	Code	HHT 201
3.	Credit	2 (2-0)
4.	Semester	4
5.	Coordinator	Prof. Dr. Ir. Imam Wahyudi, MS.
6.	Lecturers	Prof. Dr. Ir. Imam Wahyudi, MS. Prof. Dr. Ir. Sucahyo Sadiyo, MS. Dr. Ir. Naresworo Nugroho, MS. Dr. Lina Karlina, S.Hut., M.Sc. Dr. Istie Sekartining Rahayu, S.Hut., M.Si. Anne Carolina, S.Si., M.Si. Irsan Alipraja, S.Hut., M.Si., 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			
2		28				56		84

*) 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 determine the processing and optimum utilization of wood, coconut stems, oil palm trunks, rattan and bamboo based on the characteristics of the anatomical structure, physical properties, mechanical properties, and chemical components of wood.

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 scope, definitions, advantages and disadvantages of wood, coconut stems, oil palm, rattan & bamboo as industrial raw materials, characteristics of woody plants, general characteristics of wood and macroscopic characteristics of wood	Presentation of teaching materials. Debriefing sessions	Midterm Exam
2.	Students are able to describes the process of tree growth and its relation to the process of forming wood and bark	Presentation of teaching materials. Debriefing sessions	Midterm Exam
3.	Students are able to explain the anatomical structure of hardwood, softwood, and palmwood constituent cells	Presentation of teaching materials Debriefing sessions	Midterm Exam
4.	Students are able to comprehend the definitions, methods of measurement, and factors that affect water content, density, and specific gravity	Presentation of teaching materials Debriefing sessions	Midterm Exam
5.	Students are able to	Presentation of teaching	Midterm Exam

	comprehend the wood shrinkage and dimensional stability	materials Debriefing sessions	
6.	Students are able to comprehend the reaction of wood to heat, electricity, and voice (sound)	Presentation of teaching materials Debriefing sessions	Midterm Exam
7.	Students are able to comprehend the mechanical properties of wood and basic statics	Presentation of teaching materials Debriefing sessions	Final Exam
8.	Students are able to comprehend the type of wood strength and the factors that influence	Presentation of teaching materials Debriefing sessions	Final Exam
9.	Students are able to comprehend the definitions and basic principles in determining the basic stress and allowable stress of wood	Presentation of teaching materials Debriefing sessions	Final Exam
10.	Students are able to explain the types, properties, and usefulness of the main chemical components of the cell wall constituent (cellulose, hemicellulose, and lignin)	Presentation of teaching materials Debriefing sessions	Final Exam
11.	Students are able to explain the types, properties, and uses of chemical components that fill cell / non-structural cavities (extractive substances and minerals)	Presentation of teaching materials Debriefing sessions	Final Exam
12.	Students are able to explain the influence of the chemical components on the basic properties, processing, and use of wood	Presentation of teaching materials Debriefing sessions	Final Exam

E. Module Content		
List of Topic	Number of Weeks	Contact Hours
Introduction	1	2
Wood Growth and Formation	1	2
Anatomical Structure of Hardwood, Softwood, and Palmwood	2	4
Water Content, Density, and Specific Gravity	1	2
Wood Shrinkage and Dimensional Stability	1	2
Reaction of Wood to Heat, Electricity, and Voice (sound)	1	2
Mechanical Properties of Wood and Basic Statics	1	2
Factors that Influence Mechanical Properties	1	2
Basic Stress and Allowable Stress	1	2
The Main Chemical Components of Cell Wall Constituent	2	4
The Secondary Chemical Components of Cell Wall Constituent	2	4

F. Course Assessments			
No.	Assessment Type *)	Schedule (Week Due)	Proportion of the Final Mark
1.	Mid-term examination	8th week	50 %
2.	Final examination	16th week	50 %

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

G. Media Employed
<ul style="list-style-type: none"> - Classroom - Laptop - LCD - Microphone (loudspeaker) - Whiteboard

H. Learning Resources
<ol style="list-style-type: none"> 1. Bowyer JL, Shmulsky R, Haygreen JG. 2003. <i>Forest Products and Wood Science: An Introduction</i>. Iowa (US): Iowa State Press. 2. Fengel D and G Wegener. 1984. <i>Wood: Chemistry, Ultrastructure, Reactions</i>. Berlin (DE): Walter de Gruyter. 3. Forest Products Laboratory General Technical. 1999. <i>Wood Handbook: Wood as an Engineering Material</i>. Forest Products Society, US Department of Agriculture, USA. 4. Panshin, AJ and Carl de Zeeuw. 1987. <i>Textbook of Wood Technology</i>. 4-th Edition. Vol.

I. New York (US): McGraw-Hill Book Company.

5. Tsoumis G. 1991. Science and Technology of Wood: Structure, properties and Utilization. New York (US): Van Nostrand Reinhold.
6. Mardikanto TR, L Karlinasari, ET Bahtiar. 2011. *Sifat Mekanis Kayu*. Bogor (ID): IPB Press.
7. Sjostrom E. 1981. *Wood Chemistry. Fundamental and Applications*. New York (US): Academic Press.