



**University of Gadjah Mada**  
 Faculty of Forestry  
 Study Program of Doctor in Forestry Science  
**Module Handbook**

<b>Name (Code)</b>	: Wood and Resin Relationship (KTDT22801)							
<b>ECTS   Type   Status</b>	: 7.5   Class lecture   Elective							
<b>Semester   OfL:OnL Ratio   LMS</b>	: 1   60:40   elok.ugm.ac.id							
<b>Pre-Requisite</b>	: -							
<b>Description of content</b>	The course discusses the various interactions between wood and resins, internal and external resins. This course studies the properties of internal resins and their suitability for wood as adhesives, fillers or cell wall modifiers and their effect on wood processing, and properties of external resins, both synthetic and natural as adhesives, coatings and wood modification materials.							
<b>Course Outcomes and PLO mandated</b>	Finishing this course, student will be able to explain the concept, definition, identify the properties and role of internal and external resins (CO1/PLO3), to analyze the relationship of internal and external resins with good wood influence and suitability (CO2/PLO3), to formulate a wood processing process that involves resin efficiently (CO3/PLO4), and to organize the application of wood modification principles and methods in relation to the use of resins in wood-based composite products (CO4/PLO7).							
<b>Lecturer(s)</b>	<ol style="list-style-type: none"> <li>1. Prof. Ir. Tibertius Agus Prayitno, M.For., Ph.D.</li> <li>2. Ir. Muhammad Navis Rofii, M.Sc., Ph.D.</li> </ol>							
<b>Workload</b>	Total workload per semester is for 14 weeks, with weekly activities: 2*(50' lectures, 60' structured activities, 60' independent study), and 2 mid exam and final exam weeks.							
<b>Learning Method</b>	Class Lecture and Discussion							
<b>Student Learning Experience</b>	Actively discuss the class material and research cases, structured assignment, group work, quiz, material reflection, review of literature and problem in forestry sectors							
<b>Mapping CLO-syllabus</b>	<b>CLO</b>	<b>Syllabus</b>	<b>Learning form</b>	<b>Meeting</b>				
	1	<ol style="list-style-type: none"> <li>1. Trees and resins in wood</li> <li>2. Internal resin production in trees</li> <li>3. Factors affecting internal resin production</li> <li>4. Types and properties of internal resin-producing trees</li> <li>5. Anatomy of resin-producing wood, sap channel &amp; influencing factors</li> <li>6. Types of external resins: synthetic and natural</li> </ol>	Tutorial, discussion, presentation	5				
	2	<ol style="list-style-type: none"> <li>7. Interaction of wood with internal resins</li> <li>8. Mechanical treatment of internal resin-producing wood</li> <li>9. Mechanical treatment of internal resin-producing wood</li> <li>10. Compatibility of resins with wood</li> <li>11. Interaction of external resins with wood in adhesion and finishing</li> <li>12. Mechanical interaction between wood and external resin</li> </ol>	Tutorial, discussion, presentation	5				
	3	<ol style="list-style-type: none"> <li>13. Embedding process and incorporation of external resins into wood</li> <li>14. Distribution of external resin in wood constituent cells</li> <li>15. Wood processing formulations with efficient resin use</li> </ol>	Tutorial, discussion, presentation	2				
	4	<ol style="list-style-type: none"> <li>16. Chemical &amp; surface modification of wood in relation to external resins</li> <li>17. Heat modification and impregnation on the relationship of wood with external resins</li> </ol>	Tutorial, discussion, presentation	2				
<b>Assessment method</b>	<b>Base of Evaluation</b>		<b>Component of Evaluation</b>	<b>CO1</b>	<b>CO2</b>	<b>CO3</b>	<b>CO4</b>	<b>Total (%)</b>
	Participative activity		Assignment	√	√	√	√	30
	Cognitive & Psychomotoric		Mid exam	√	√			30
	Case Study result		Final exam/ presentation		√	√	√	40
<b>References</b>	<ol style="list-style-type: none"> <li>1. Hill, C.A.S. 2006. Wood Modification: Chemical, Thermal and Other processes. John Wiley &amp; Sons, Ltd. Chicester. p.239.</li> <li>2. Rowell, R.M. 1999. Specialty Treatments, in Wood Handbook: Wood as an Engineering Material. Forest Products Laboratory, Madison.</li> <li>3. Rowell, R.M. (ed). 2005. Handbook of Wood Chemistry and Wood Composites. CRC Press. Boca Raton. p.487.</li> <li>4. Shmulsky, R., P.D. Jones. 2011. Forest Products and Wood Science, An Introduction, 6th ed, John Wiley &amp; Sons, Chicester, UK. P496.</li> </ol>							