Course Module

Tree Biology

Faculty of Forestry
Mulawarman University

Module name	Tree Biology
Modul level, if applicable	Doctoral
Code, if applicable	220401902P034
Subtitle, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	The course is available in all active teaching semesters
Person responsible for the module	Dr. Erwin S.Hut., M.P
Lecturer	Dr. Erwin S.Hut., M.P
Language	Indonesia
Relation to curriculum	Elective Course
Type of teaching, contact hours	Direct instruction, discussion, and assignment
Workload	Number of meetings per semester 16 meetings (14 meetings for learning activity, 1 meeting for mid-semester, 1 meeting for final examination) For this course, students are required to meet a minimum of 79.3 hours per semester, which consist of : - 23.33 hours for lecture - 28 hours for structured assignments - 28 hours for individual study
Credit points	Credit points: 2 SKS / 3.2 ECTS Details: 1 Credit = 170 min / week 1 Credit = 170 min x 14 week = 2380 min / semester 1 Credit = 39.7 h / semester 1 ECTS = 25 h/ Semester 1 Credit = 1.59 » 1.6 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	-
Recommended prerequisites	-

Module objectives/intended learning outcomes	**Intended Learning Outcome (ILO)** **Attitude (A)** 1. **ILO1 (A1)** – Internalize scientific values, norms, and ethics **Knowledge (K)** 2. **ILO2 (K1)** - Able to synthesize knowledge acquired from research findings with novelty and its implementation 3. **ILO3 (K2)** - Able to discover and develop scientific conceptions with novelty value, and able to develop scientific arguments as science solutions **General Skills (GS)** 4. **ILO4 (GS1)** - Able to criticize the philosophy, theory, and methodology of research in forestry and moist tropical environment studies through interdisciplinary, multidisciplinary, and transdisciplinary approaches **Content Learning Outcome (CLO)** 1. **CLO1:** Students are able to synthesize the latest forestry research for practical innovation and implementation. **ILO2 (K1)**. 2. **CLO2:** Students are able to develop new scientific concepts and scientific arguments in forestry. **ILO3 (K2).** 3. **CLO3:** Students are able to critique and apply forestry research theories and methodologies in an interdisciplinary manner. **ILO3 (GS1).** 4. **CLO4:** Students are able to manage and analyze forestry data to support decision-making. **ILO3 (GS1).** 5. **CLO5:** Students are able to demonstrate ethical conduct and a commitment to sustainable forestry practices. **ILO1 (A1)**.

<table>
<tr><td>Content</td><td>This course on Tree Biology offers a comprehensive exploration of the biological aspects of trees, spanning their anatomy, physiology, and ecological roles within forest ecosystems. Initially, students are introduced to the basic anatomy and morphology of trees during the first two meetings, setting a foundation that supports more complex topics. Subsequent classes delve into the core physiological processes of photosynthesis, respiration, and transpiration. The course progresses to examine ecological interactions and symbiosis, highlighting the integral roles trees play in maintaining forest ecosystems. Attention is then shifted to the economic perspectives of trees, discussing timber and non-timber forest products across two separate sessions. Advanced methodologies, such as GIS and remote sensing, are explored to equip students with modern research techniques relevant to tree biology. The curriculum also addresses tree management strategies and the impact of climate change on tree physiology. The complete topic of each meeting is mentioned below:

1. Contract and Introduction to Tree Biology, Anatomy and Morphology (1st and 2nd sessions) → CLO1
2. Tree Physiology I & II, Photosynthesis, Respiration and Transpiration (3rd and 4th sessions) → CLO1
3. Ecological Interactions of Trees & Symbiosis in Forest Ecosystems (5th and 6th sessions) → CLO1
4. Tree Benefits I, Timber Products (7th session) → CLO4
5. Midterm Examination (UTS) (8th session) → Assessment
6. Tree Benefits II, Non-Timber Forest Products (NTFPs) (9th session) → CLO4
7. Tree Variations Across Ecosystems (10th session) → CLO2
8. Advanced Tree Biology Research Techniques I & II, GIS and Remote Sensing (11th and 12th sessions) → CLO3
9. Tree Management Strategies and Climate Change (13th and 14thsessions) → CLO3
10. Research Presentation (15th session) → CLO2
11. Final Examination (UAS) (16th session) → Assessment</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of learning achievement based on scheme 1in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No</th><th>Objects of Evaluation/Assessment:</th><th>Forms of E/A</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Participation</td><td>10</td></tr>
<tr><td>2</td><td>Assignments/Case Study</td><td>Group Presentation</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Presentation</td><td>25</td></tr>
<tr><td>4</td><td>Mid-Semester Test</td><td>Written test</td><td>15</td></tr>
<tr><td>5</td><td>Final Examination</td><td>Written test</td><td>25</td></tr>
</table></td></tr>
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	Total	100
Media employed	Class, Ms. Powerpoint, Ms. Word, Computer, LCD, STAR	
Reading list	1. DESCH, H.E. and Dinwodie (1981): Timber its Structure, Properties and Utilisation. Timber Press Forest Grove. Oregon. 2. SHIGO, L. ALEX (1989): A New Tree Biology (=NTB). (Facts, Photos, And Philosophies On Trees And Their Problems and Proper Care. Durham. USA. 3. HIGHLEY TL (1999). Biodeterioration of Wood. Department of Agriculture. Forest Service. USA 4. SCHMIDT O (2006). Wood and Tree Fungi: Biology, Damage, Protection , and Use. Springer-Verlag. Berlin 5. Biological sciences, Plant Anatomy. CD 6. Additional articles which related to the subject	